CII 18th National Award for Excellence in Energy Management 2018

UltraTech Cement Limited: Unit - Rawan Cement Works

Team Members:

Mr. DS Chandrashekhar (GM Inst. & Energy Manager)

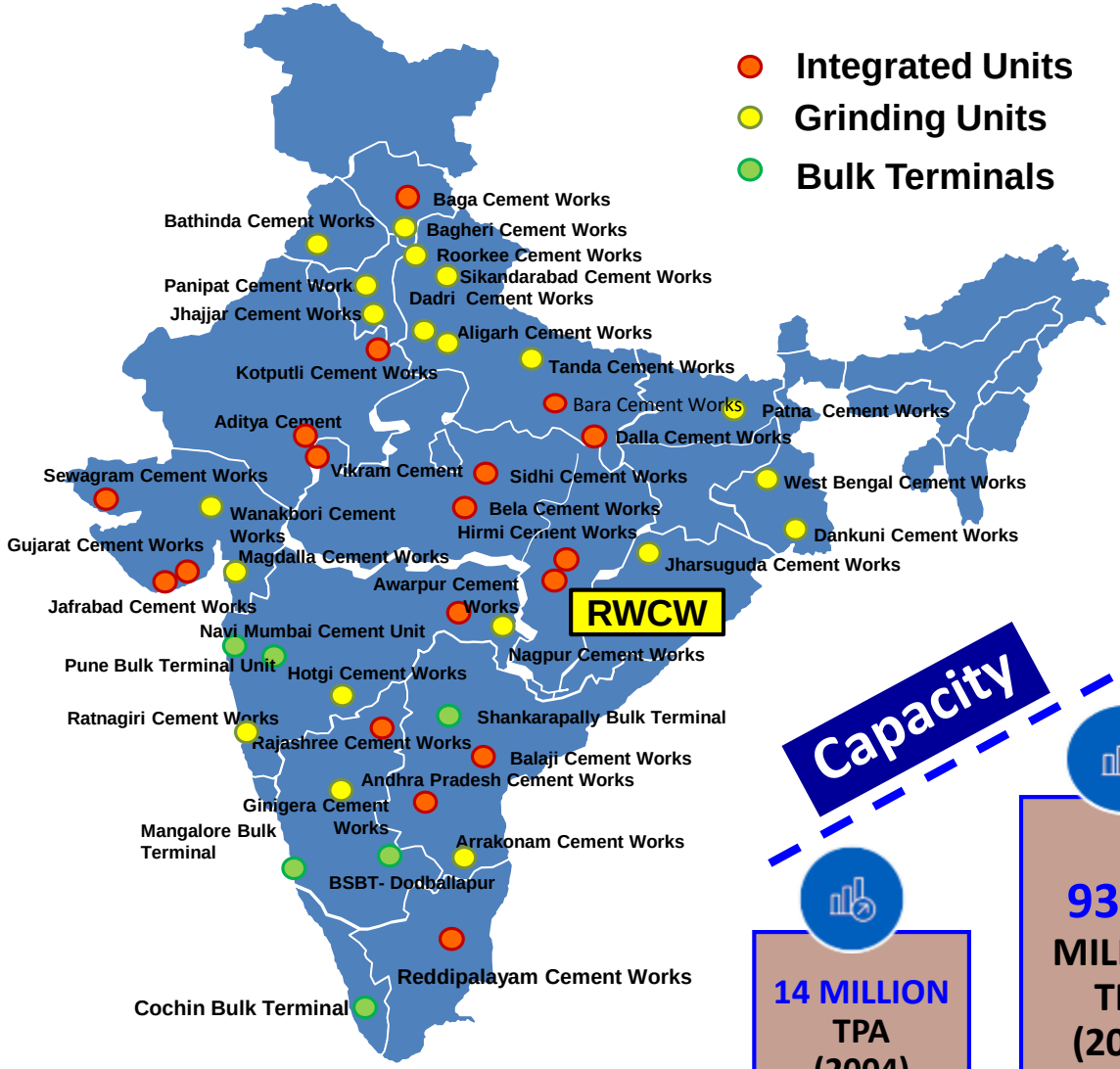
Mr. GS Virdi (GM Production)

Mr. Pradeep Agrawal (Manager Technical Services)

Integrity | Commitment | Passion | Seamlessness | Speed

Contents

Business Overview



Largest Cement Player in India – Lead by Mile

Capacity

14 MILLION TPA (2004)

93.00 MILLION TPA (2017)

Units	Symbol	Number of Units
Integrated Plants		19
Grinding Units		25
Bulk Terminals		7

Integrity | Commitment | Passion | Seamlessness | Speed

Looking Ahead

Our Aspiration, Going Forward

- 25% Market Share
- Add 14 Million Tonne Capacity
- Double our revenues
- Triple the EBITDA – *Lead by Mile
- One in three homes built in India with UltraTech Cement
- No. 3 in the World

Unit's Vision & Mission

VISION

To be the Leader in Building Materials with focus on our Values & create a Sustainable future in the UltraTech Cement of Aditya Birla Group.

MISSION

Leading with latest technologies for delivering the values to our customer's by following four focal areas:

1. **Sustainability**
2. **Quality & Bosstomer Satisfaction**
3. **Employee Engagement & Team Empowerment**
4. **Cost Effectiveness & Innovation**

UltraTech Rawan Cement Works At a Glance

ADITYA BIRLA UltraTech

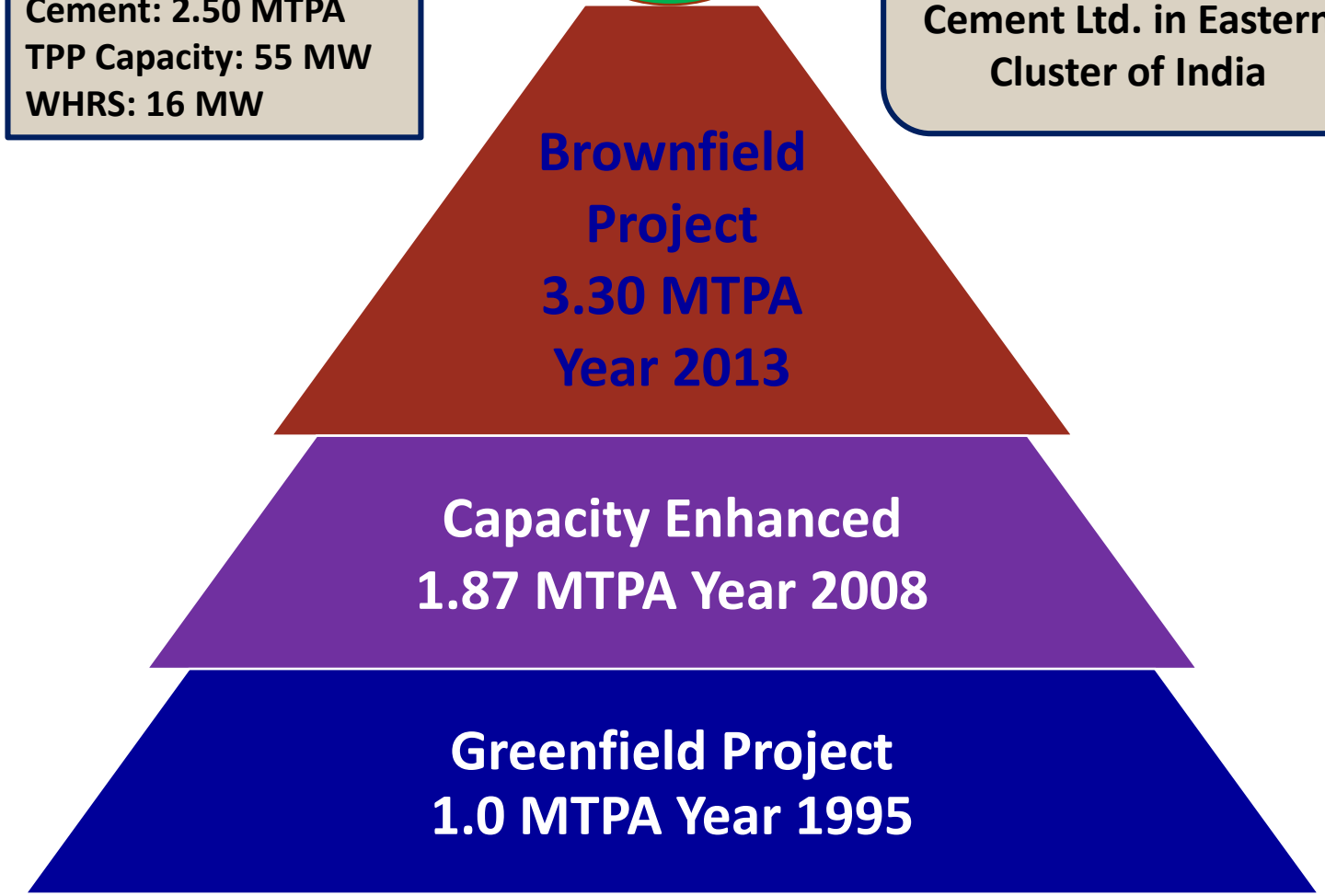
Build beautiful UltraTech CEMENT The Engineer's Choice

Plant Capacity

Clinker: 5.17 MTPA
Cement: 2.50 MTPA
TPP Capacity: 55 MW
WHRS: 16 MW

RWCW

RWCW is the largest unit of UltraTech Cement Ltd. in Eastern Cluster of India



RWCW Major Equipment Details

Line 1 (1995)	Line 2 (2013)
RAW MILL	
Loesche VRM 375 TPH	KHD Roller Press 3 × 275 TPH
COAL MILL	
Loesche VRM 40 TPH	Pfeiffer VRM 90 TPH
KILN	
FLSmidth (SLC + ILC) 5600 TPD	KHD (4 Strings ILC) 10000 TPD
CEMENT MILL	
KHD RP + Ball Mill (PPC – 305 TPH) (OPC – 220 TPH)	Polycom for Slag Grinding (PSC – 220 TPH) (PCC – 225 TPH)

Cement Manufacturing Process

Pre Clinkerization

Mining

Crushing

Stacking & Reclaiming

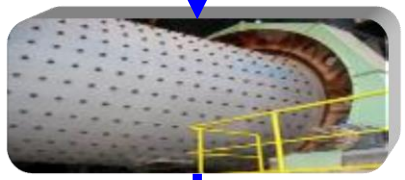
LS Grinding

Clinkerisation

Coal Grinding

Post Clinkerization

Additives



Clinker Grinding

Packing

Delivery Truck

Delivery Rack

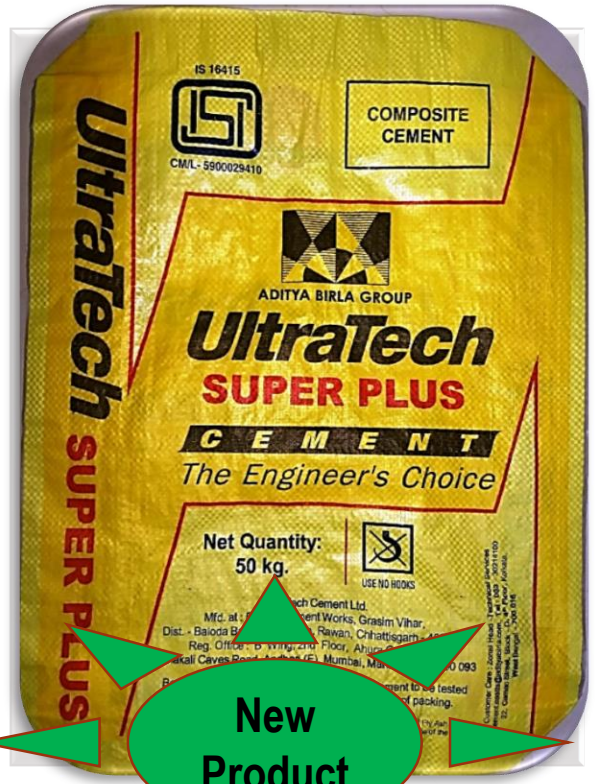
Delivery Bulker

Integrity | Commitment | Passion | Seamlessness | Speed

Product Range

PPC	PSC	OPC53S (IRST40)	PCC

New Product



New Product

Integrity | Commitment | Passion | Seamlessness | Speed

Unit's Milestones & Achievements

- Manufacturing of Composite Cement
- Lowest Sp Power in PPC Grinding among all UltraTech Plants (21.99 kWh/MT) in FY18
- Highest Conversion factor of 1.674 – Lowest Carbon Footprints/Specific CO_2 Emissions in UltraTech (Sustainability Audit By KPMG Scope 1, Scope 2 & Scope 3)
- Highest Alternate Raw Materials using plant in UltraTech,
- Reduction of specific heat 7 Kcal/Kg clinker by ABC Inlet Installation in Line-1 Cooler
- Lowest Cost manufacturing plant in UltraTech for FY 2018
- Installation of unique 132KV Dedicated Power pooling between Rawan & Hirmi plants

Unit's Best Practices

- Replication of Kaizens –Major Process Fan Inlet Box Modification Preheater, Raw Mills, Coal Mill, etc.
- Conversion of Coal Mill & Cement Mill ESP to Bag house to reduce emissions to < 20 Mg/Nm3
- Ever highest kiln refractory life achieved in Line-2 : 11.3 Months
- Ever highest Burner refractory life achieved in Line-2: 13.4 Months
- Visual Indicator in confined space – Safe Entry Indicator
- Grinding Mill's Door Safety Interlocks – Sensor Based
- Consistent Hazardous Waste Utilization & Identification of new sources.
- Foot Over Bridge & Drop Gate for Railway Crossings– Sensor Based

Certifications

DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

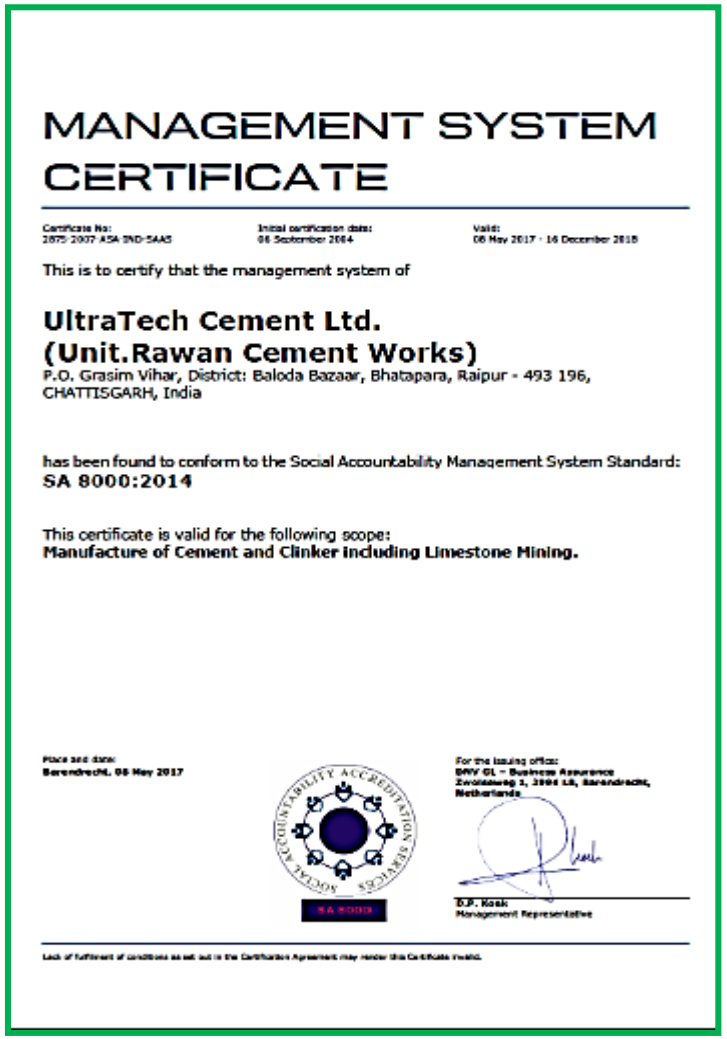
This is to certify that the management system of

UltraTech Cement Ltd.
(Unit: Rawan Cement Works)
P.O. Grasim Vihar - 493 196, District: Baloda Bazaar - Bhatapara, Chhattisgarh, India

has been found to conform to the Management System standard:
ISO 9001:2008
ISO 14001:2004
OHSAS 18001:2007

This certificate is valid for the following scope:
Manufacture of cement and clinker

ISO 9001, 14001, OHSAS 18001



MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of

UltraTech Cement Ltd.
(Unit.Rawan Cement Works)
P.O. Grasim Vihar, District: Baloda Bazaar, Bhatapara, Raipur - 493 196, CHATTISGARH, India

has been found to conform to the Social Accountability Management System Standard:
SA 8000:2014

This certificate is valid for the following scope:
Manufacture of Cement and Clinker including Limestone Mining.

SA 8000

DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of

UltraTech Cement Limited
Unit: Rawan Cement Works
P.O. Grasim Vihar, Village: Rawan - 493 196, District: Balodabazar - Bhatapara, Chattisgarh, India

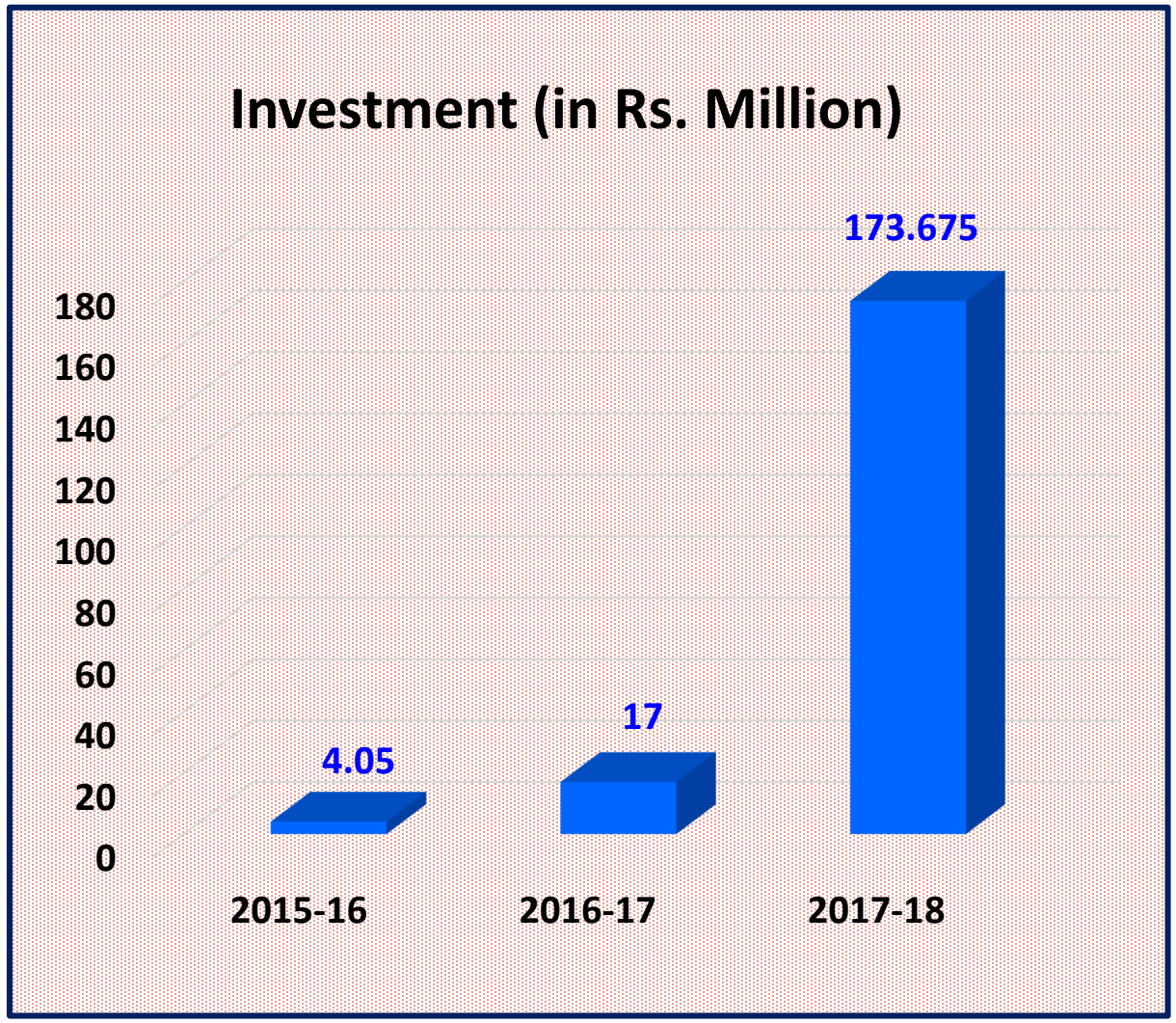
has been found to conform to the Information Security Management System standard:
ISO/IEC 27001:2013

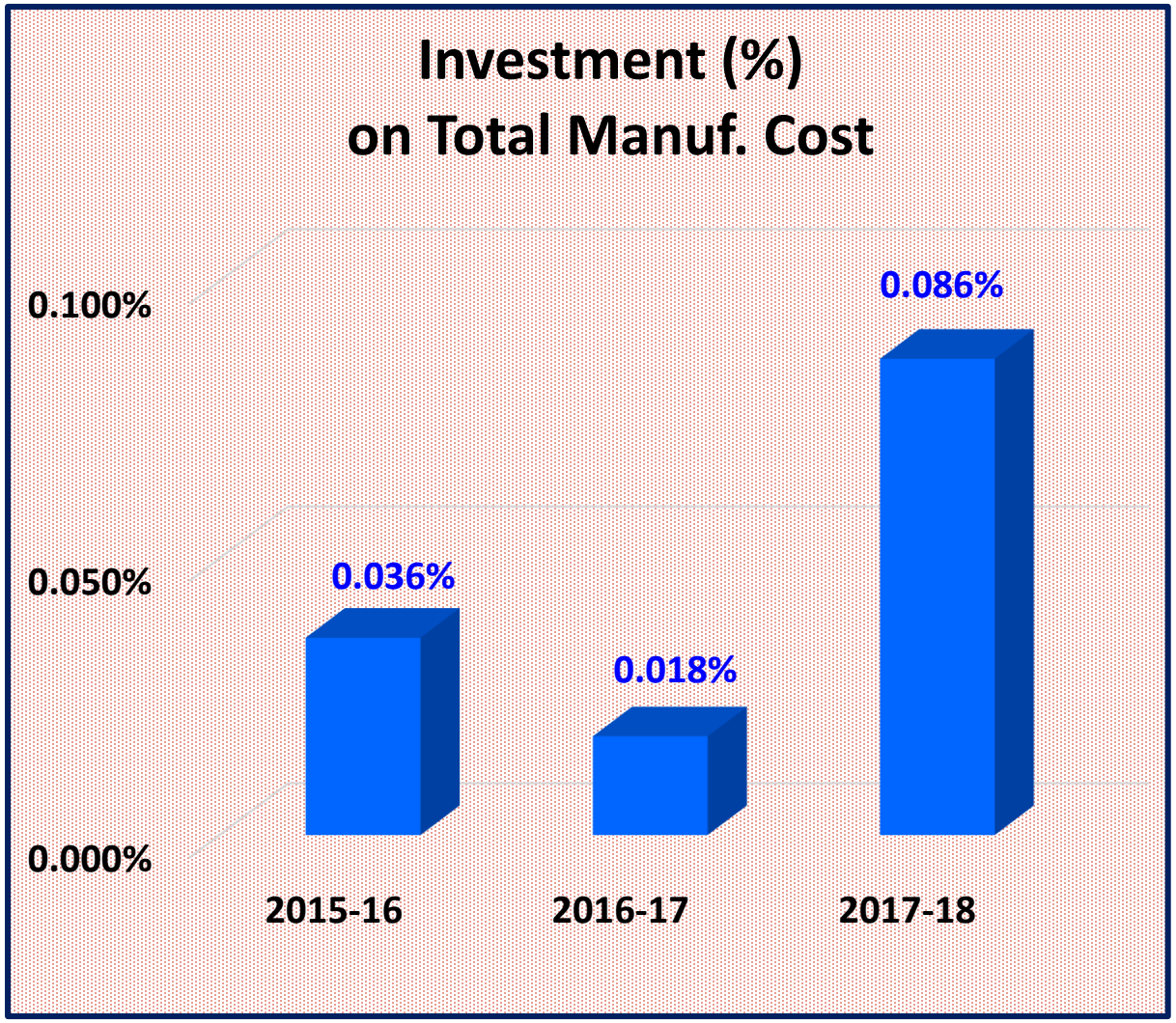
This certificate is valid for the following scope:
Management of information security pertaining to IT services provided by information technology department in accordance with the statement of applicability version 3.0 dated 01.09.2015

ISO 27001

Integrity | Commitment | Passion | Seamlessness | Speed

Percentage Investment for ENCON Projects





Energy Management Policy

Energy Policy implemented in 2009

- Energy Policy states unit's commitment towards continual energy performance improvement
- Energy policy is communicated at all levels
- Daily Review of Energy & PAT data w.r.t BEST
- Dedicated Energy Cell with fortnightly review
- Three layer Team Structure for stringent Monitoring

Energy Policy

UltraTech Cement Ltd.
Unit- Rawan Cement Works.

As a way of life, we, the employees of Rawan Cement Works are committed and pledge to conserve Energy judiciously in all our activities, product and services across the organization. We shall endeavor to transformer energy conservation into a strategic business goal fully aligning with technological advancements by improving the skill and knowledge of our employees for sustainable development.

To achieve excellence, our objectives therefore will be:

- To reduce specific energy consumption in all our operations and activities.
- To conserve fossil fuels through enhanced use of renewable energy/recovered waste energy/ Alternate fuel
- To adopt energy efficient technologies/ equipments for all new projects.
- To ensure energy conservation awareness programme throughout the organization.
- To recognize efforts of our employee and their family members in energy conservation initiatives.
- To replace old energy inefficient technology/ equipments with the latest energy efficient state of art technology/ equipment continually.
- To control energy consumption by periodic review and improving our process by motivation and training practices.
- To sustain energy efficiency gains by establishing and maintaining a management information system designed to support managerial decision making.
- To conduct regular management reviews to ensure continual improvement and achieve of our goal.

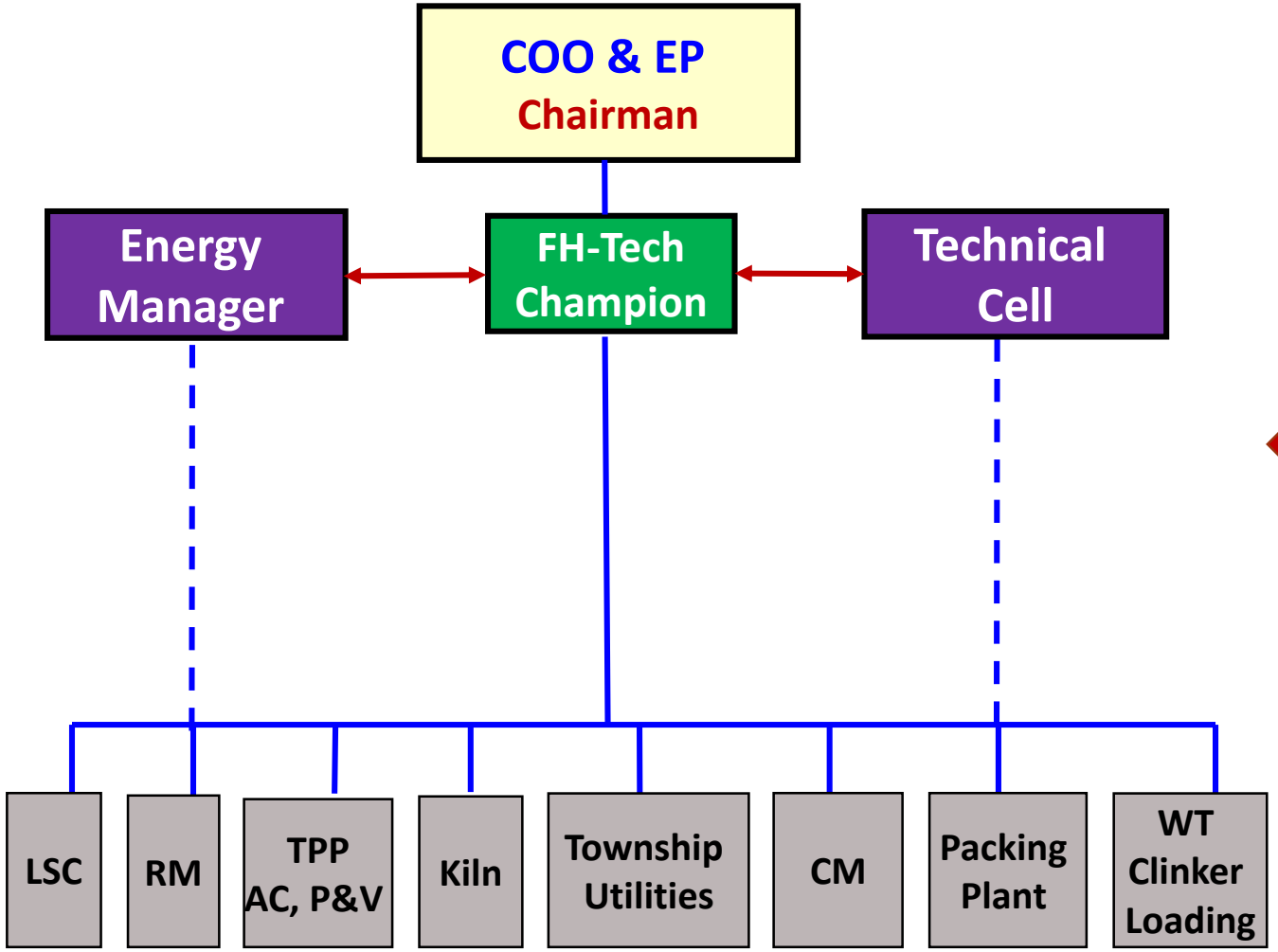
Date: 01.04.2016.

Kiran D Patil
COO & Executive President
Rawan Cement Works

Regular Improvement Projects on Energy Conservation

Real time power consumption data monitoring through online Energy Monitoring System

Energy Management Structure

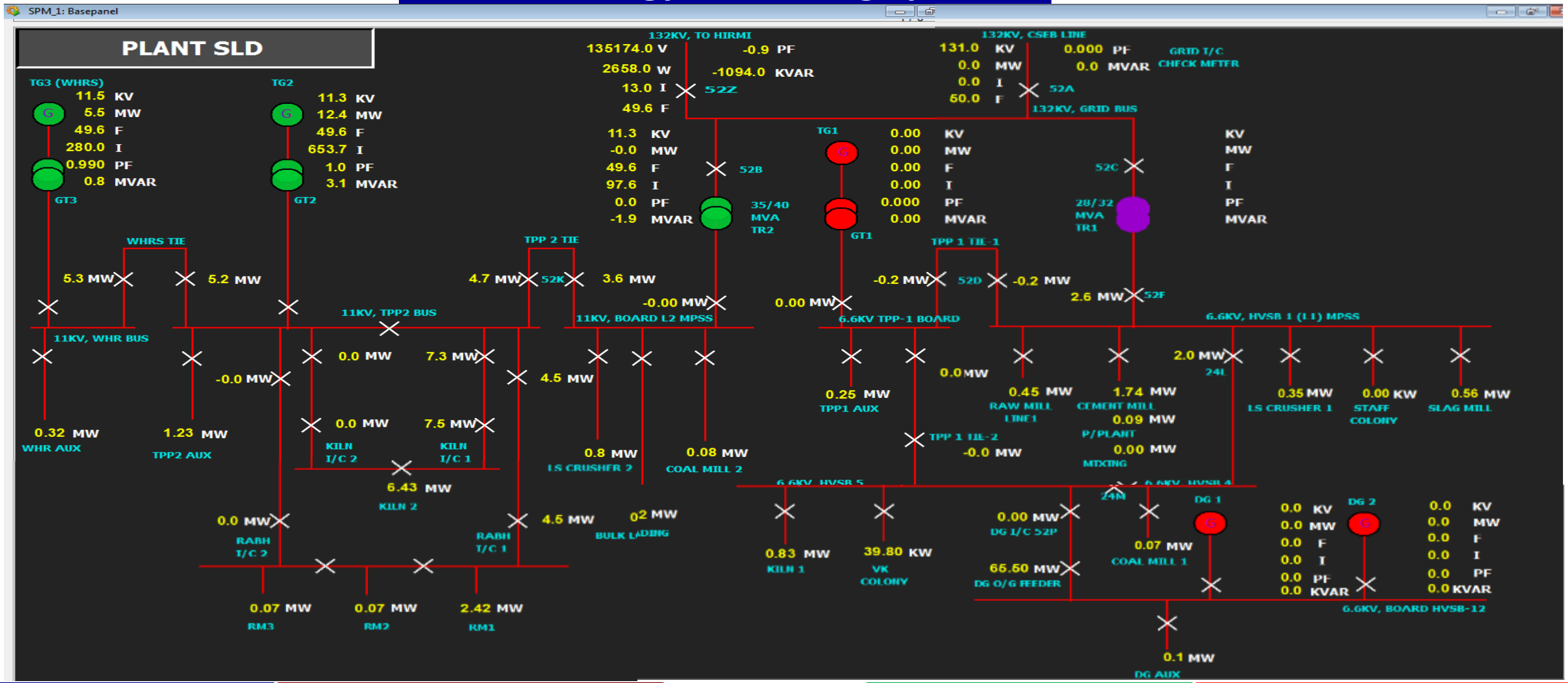


Energy Cell Functioning Focus Area

- Restoring Basic Condition of Equipments
- Process/Energy Optimization
- Innovation
- Technological Up-gradation
- Awareness / Campaign / Knowledge Management

Energy Monitoring, Reporting & Implementation Methodology

Online Energy Monitoring System



Integrity | Commitment | Passion | Seamlessness | Speed

Dedicated Energy Cell

Cross Functional Action Team for Energy Conservation

1	LS Crusher	Mr. Rajesh Soun	Electrical(SH)
		Mr. Ritesh Srivatava	Mech.
		Mr. Tarun Kar	Instt.
		Mr. Devendra Deshmukh	Mines Operations
		Mr. Manish Paliwal	Elect.
2	Raw Mill	Mr. Sangram Naik	Electrical(SH)
		Mr. Pushraj Singh	Mech.
		Mr. Rupesh Upadhayay	Mech.
		Mr. Tarun Kar	Instt.
		Mr. Sanjay Kataria	Process
3	Coal Mill	Mr. DVB Reddy	Electrical(SH)
		Mr. Karan raj Gupta	Mech.
		Mr. Shekhar Kumar	Mech.
		Mr. Satish Bagmar	Instt.
		Mr. Sanjeev Choubey	Process
4	Kiln	Mr. Sandeep Bajpai	Electrical(SH)
		Mr. R.K. Tiwari	Mech
		Mr. Pramit Ujjain	Mech
		Mr. Adityaram	Instt.
		Mr. Vikas Sahu	Process
5	Cement Mill	Mr. Ashok Ojha	Electrical(SH)
		Mr. Rajkumar Gole	Mech
		Mr. Prashant Chauhan	Instt.
		Mr. Manish Mishra	Process
6	Packing Plant	Mr. Ashok Ojha	Electrical(SH)
		Mr. Sanjeev Mishra	PP Operation
		Mr. Sunil Yadav	Mech
		Mr. Prashant Chauhan	Instt.
7	TPP	Mr. Ravi Raw	Electrical(SH)
		Mr. Yogesh Rathore	Mech
		Mr. Vinit Desai	Instt.
		Mr. Pawan Pothghan	Operation
8	WHRS	Mr. P.S. Rangnath	Electrical(SH)
		Mr. Dharmendra Manikpuri	Mech
		Mr. CP Gupta	Instt.
		Mr. Rajesh Sharma	Operation
9	Utility	Mr. Sangram Nayak	Electrical(SH)
		Mr. V Gogi	Utility (SH)
		Mr. Shyam Narayan Sahu	Mech.
		Mr. GVS Dadi	Elect.
		Mr. Ankush Gwande	Electrical

Energy Cell Meeting

- All team presents sectionwise Power and Performance
- Discussion over deviation (if any)
- New Ideas on power saving
- Target date and Responsibility allocation
- Last meeting MOM review

Energy Auditor/Manager

DS Chandrasekhar
Energy Manager – EM 1476

Shriprakash B Gupta
Energy Auditor – EA 5934

Shailendra Pandey
Energy Manager – EA14607

P C Shekhar Rao
Energy Manager –EA 20580

Vibhav Jaiswal
Energy Manager – EM 3325

Shivkumar Singh Yadav
Energy Manager – EM 14750

Dinesh Kumar Patel
Energy Manager – EA 6466

Integrity | Commitment | Passion | Seamlessness | Speed

Energy Monitoring, Reporting & Implementation Methodology

Energy Management Cell with defined responsibilities.

Daily monitoring of Energy Deviation report.

Benchmarking with National/International/Group Units/Cluster units and action plan for improvement.

Regular study of Equipment's on deviation and their analysis.

Process Evaluation & Identification of Energy Conservation scope.

Feasibility study of suggestions and designing proposals for sanctions.

Promoting energy saving idea generation by shop floor teams and time bound implementation

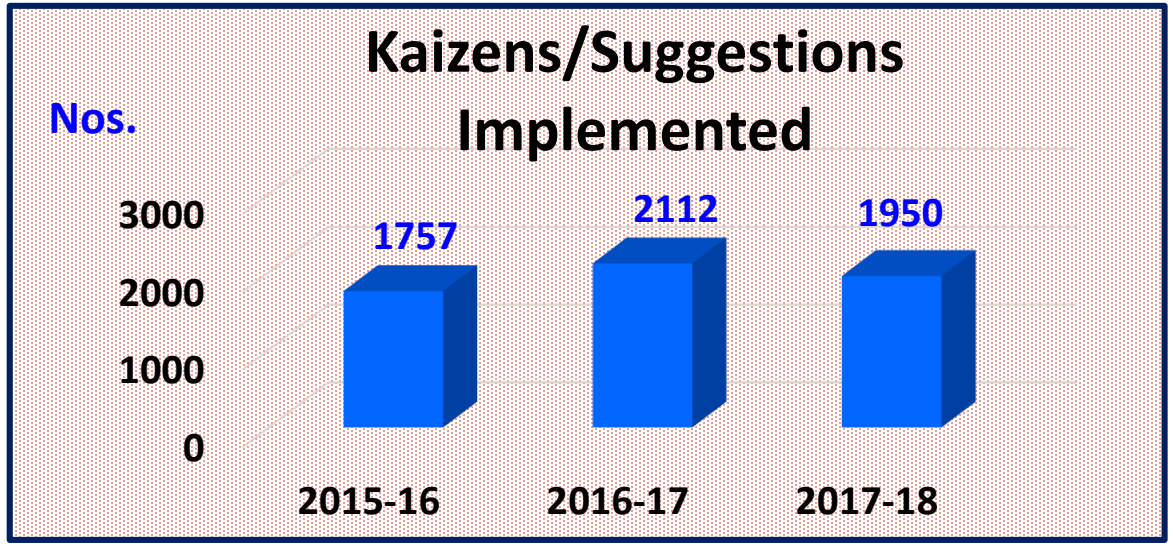
Organizing Internal and External Energy Audit.

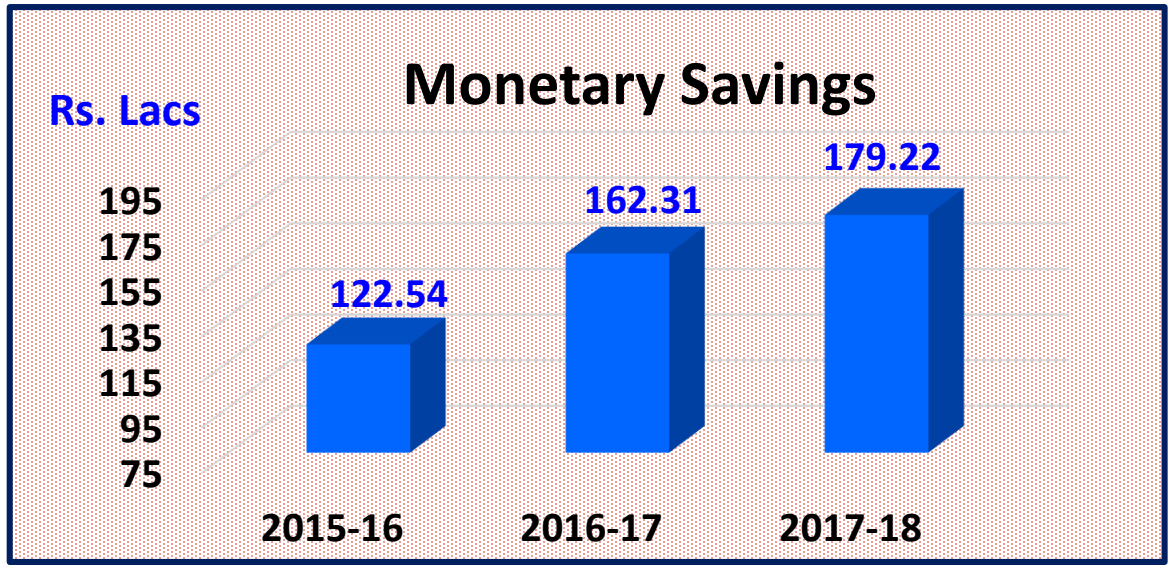
Monitoring & Review Formats

Description	Formats
Daily Co-ordination meeting on Power and Performance review	Daily Meeting PPT
Review of Daily Power Report for any deviation	Daily Power Review 31.07.2018
Energy Cell Meeting Points Compliance review	MOM Energy Cell May'18
Energy Audit (Internal & External) Points Compliance	MEA Audit Compliance 2018

Team Work & Employee Involvement

- Kaizen & Suggestions Schemes
- Annual Improvement Projects
- Organization Knowledge
- KIP Visits
- External & Internal Trainings on Energy
- Participation in Seminars
- Team competition
- Energy Conservation Week
- Awareness creating to all Colony residents for Energy Conservation
- Online Training need identification through Poornata on Energy Conservation
- Reward & Recognition





Team Work & Employee Involvement

Annual SWOT Analysis

Strength

S1. Safety Culture -S
S2. Blended Cement Market - P
S3. Self sufficient water reservoir - D
S4. Clinker Bulk Loading -P
S5. Sourcing of material at lower cost – D
S6 Self sufficient Captive Power Plant – D
S7 Less consumption of additives – C
S8 Closer to raw material & Slag Sources – C
S9 Maintenance Inspection system – D
S10 Use of pet Coke in Kiln – Q,C

Opportunity

O1. Increase in Blended Cement - P
O2. Raw meal getting bottleneck - P
O3. Reduction of contract workmen - Em
O4. Correctives (Raw Mat.) elimination/ subs- C
O5. Waste heat recovery system – I,C
O6. Reduction in demurrage Cost - C
O7. Tailor made product to customer - Q.
O8. Capacity Enhancement – P
O9. Young workforce - Em
O10. Conversion Factor Clinker to Cement-P

Rawan Cement Works, Strategy Development

S1,W4,T1 *1. Safety a Morale-S,E*
S8,O10--- *2. Increase use of Slag, Fly Ash and Bed Ash- C, So*
S3,O4---- *3. Maximize Clinker Production - P*
S10,O7,T5 *4. Increase 1 day Strength– Q*
O1,W1---- *5. Lowest manufacturing cost plant - C*
O3,W1,T2 *6. Best Energy efficient plant globally – C*
S8,W2,T4 *7. Supplier Partnership – D*
O5,W6---- *8. Use of Alternate Fuel and Quality of Life - C, So*
S2,W7----- *9. Maximize Blended cement 100%- P, C, So*
S4,W5---- *10. Maximizing bulk clinker dispatch.*

Weakness

W1. Inconsistency in kiln throughput – P
W2. High Inventory Cost-C
W3. Mineralized Zone blockage (Over Burden)–C
W4. Quality of Life - E
W5. Congested inbound/outbound logistics – C
W6. High Power Cost – C
W7 Low Mine Life – I
W8 No Alternate fuel usage – E,C
W9 High energy consumption – C
W10 High stack emission when mode changed - Q

Threat

T1. Talent Retention due to emerging plants-P
T2. Stringent & New Legal norms – P,C
T3. Local leaders and society. - S
T4. Decreasing slag availability – P
T5. Entry of new players in competition - C

Team Work & Employee Involvement


COO & EP Addressing


Best Encon Kaizen Award


Good Work Done Award


Best Encon Team Performance

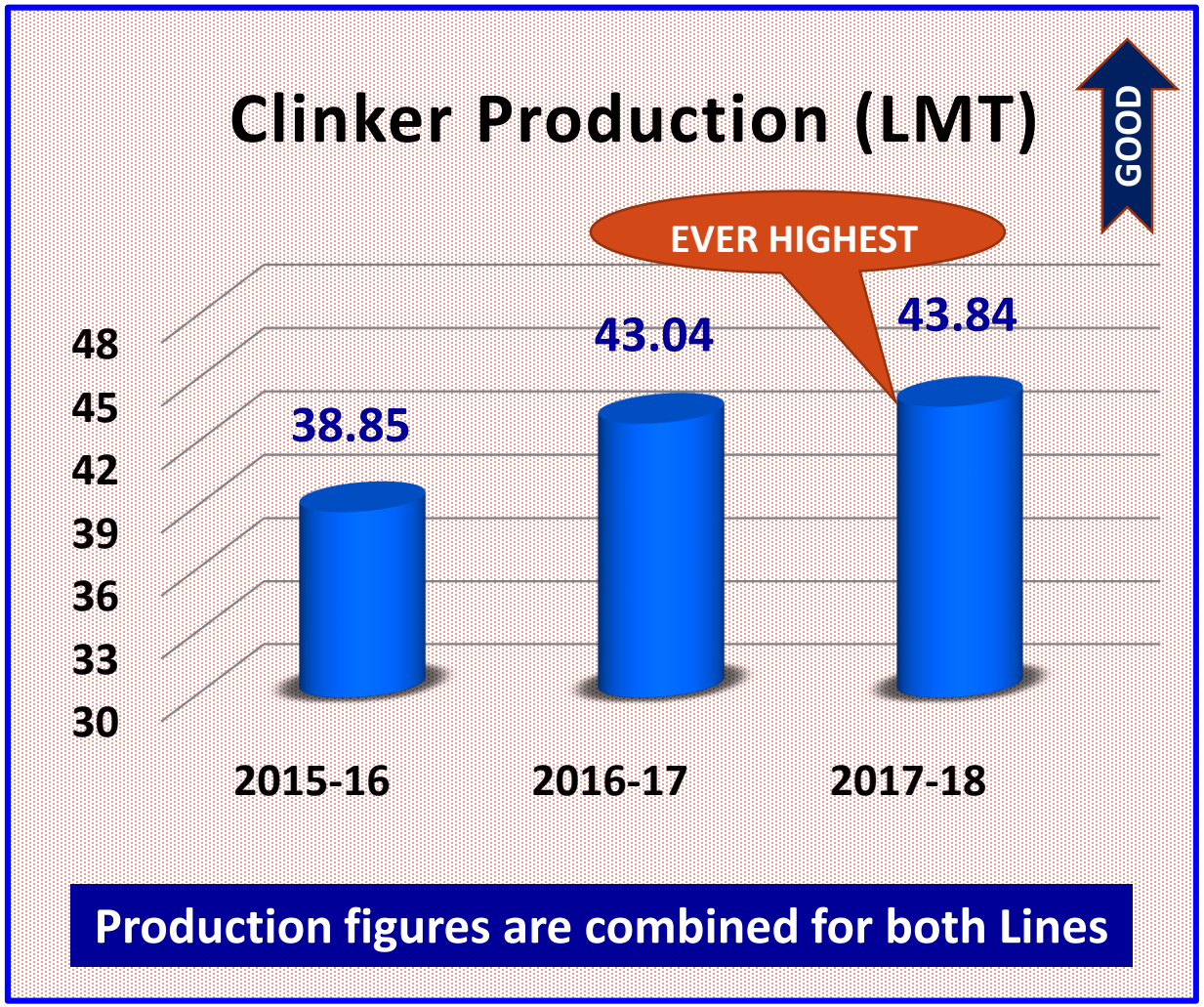

Best Encon Suggestion Award

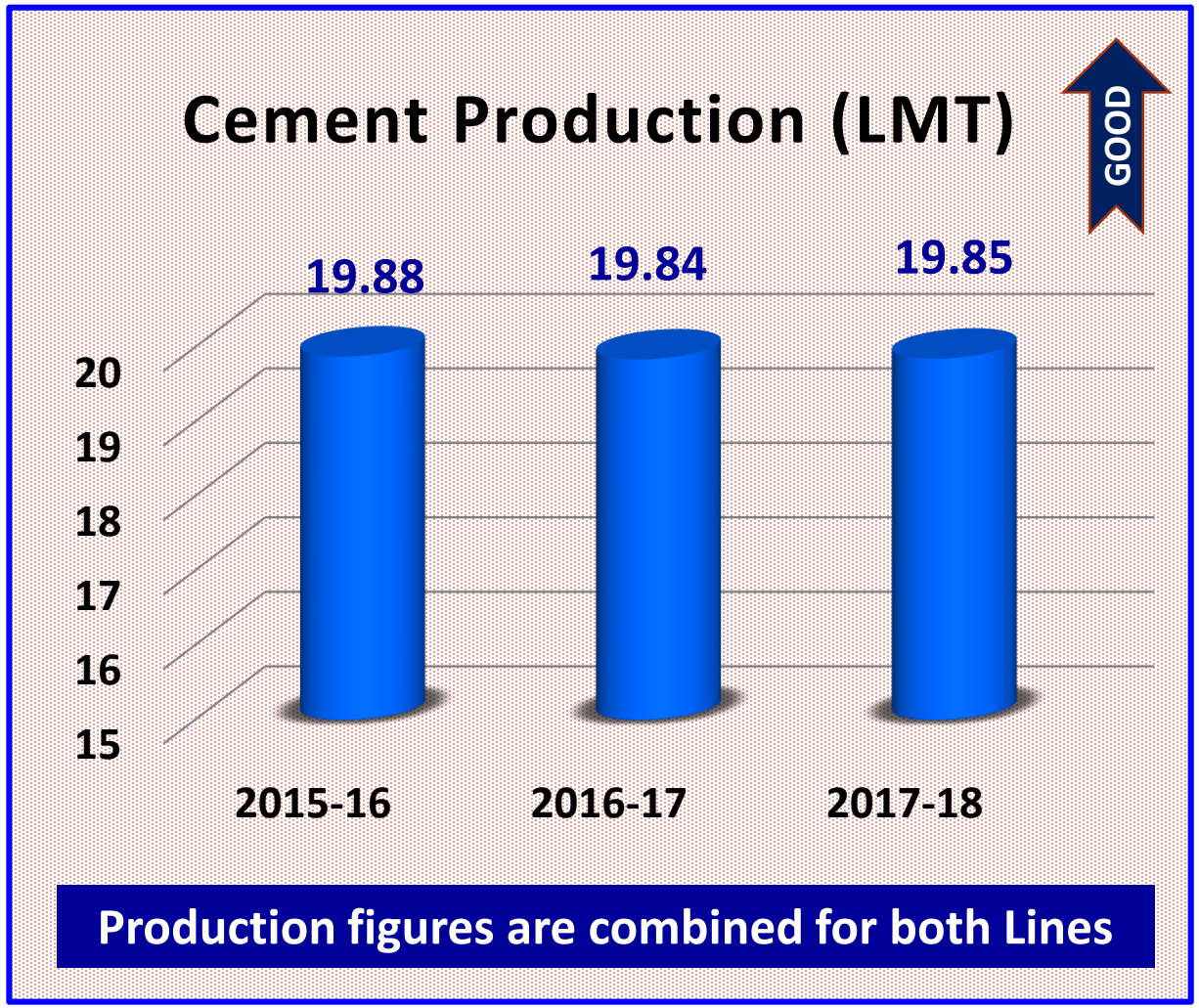

Monthly Masscom Meeting

Integrity | Commitment | Passion | Seamlessness | Speed

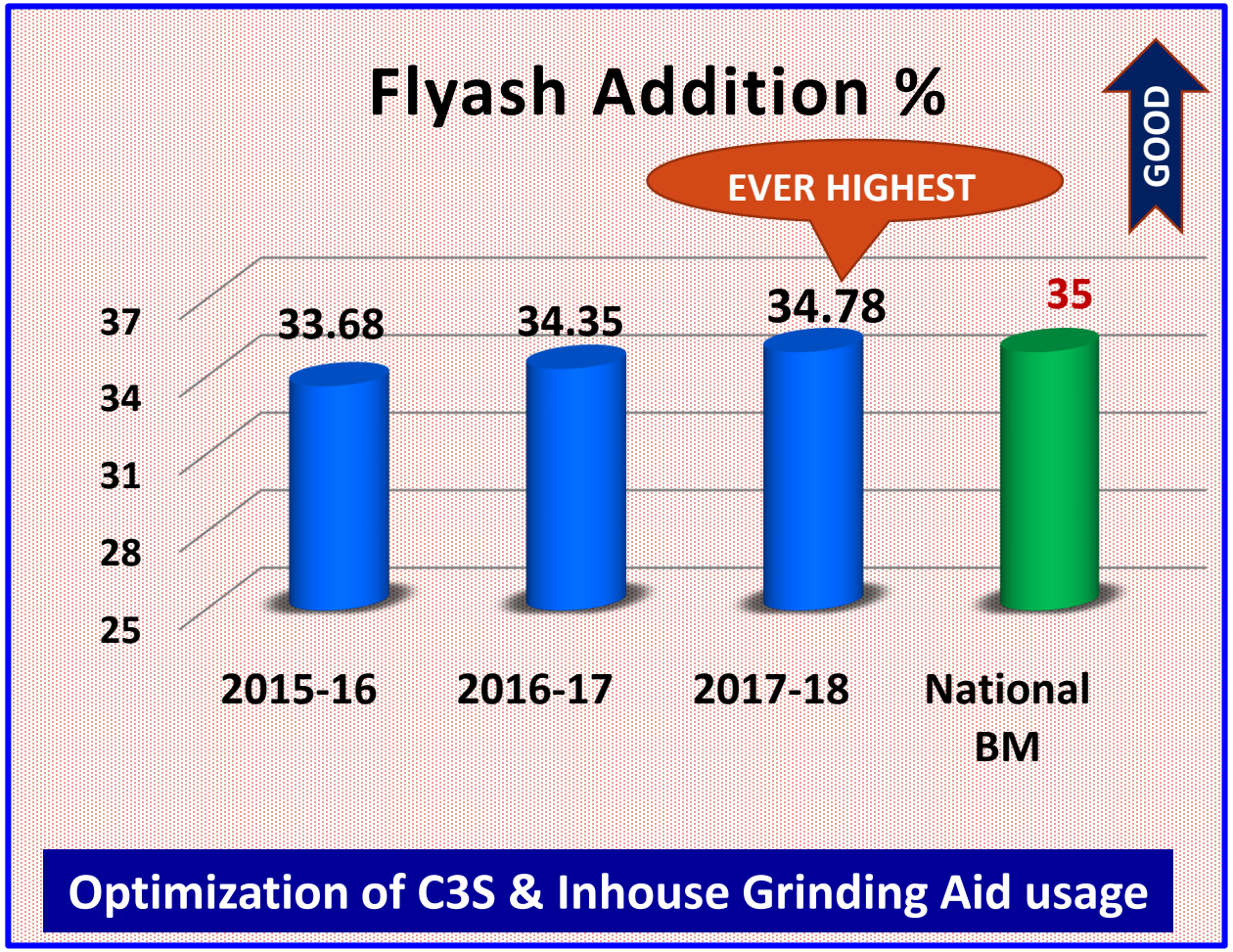
Unit's Performance
1. Sp Energy Consumption in Last 3 Years

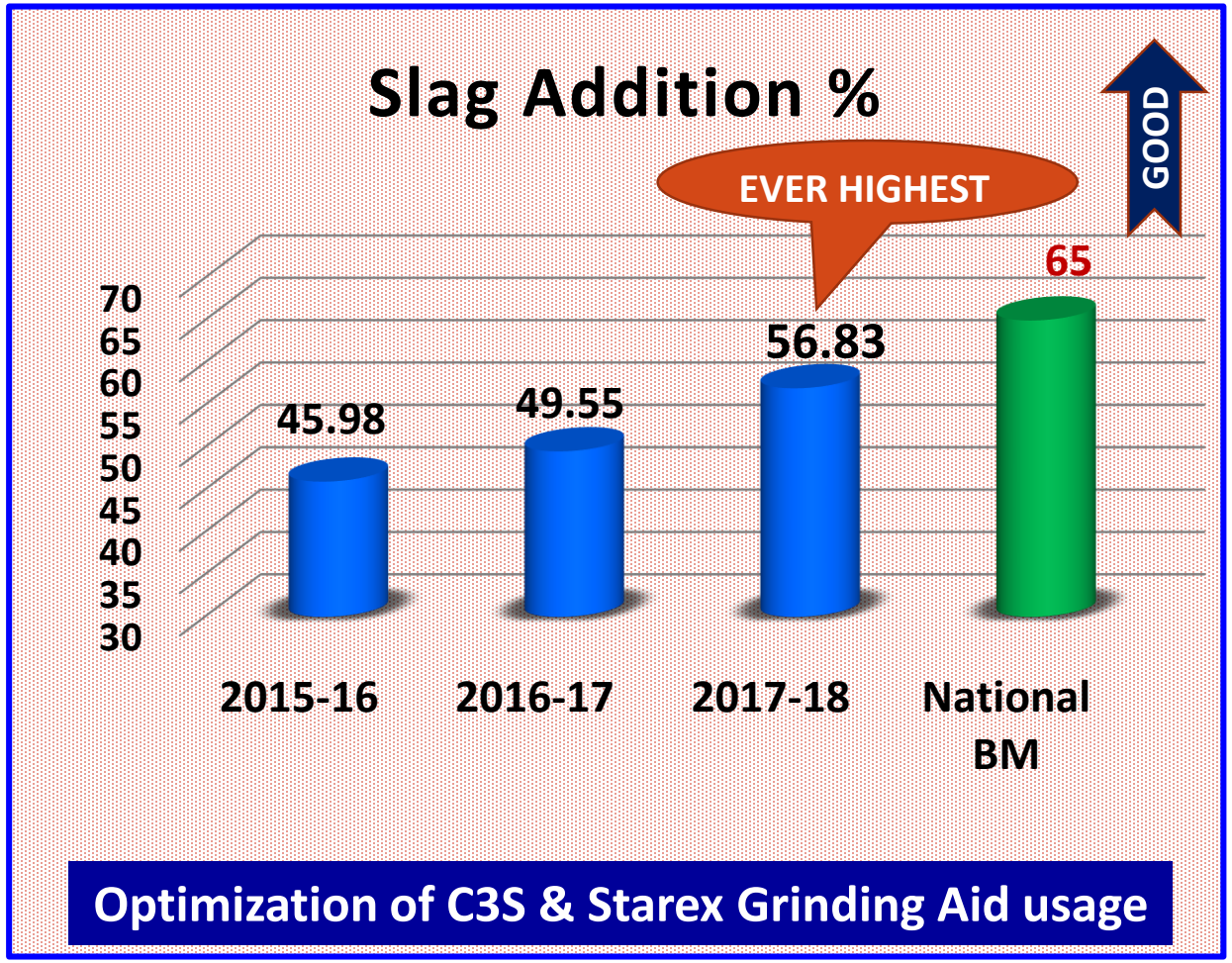
Unit's Performance





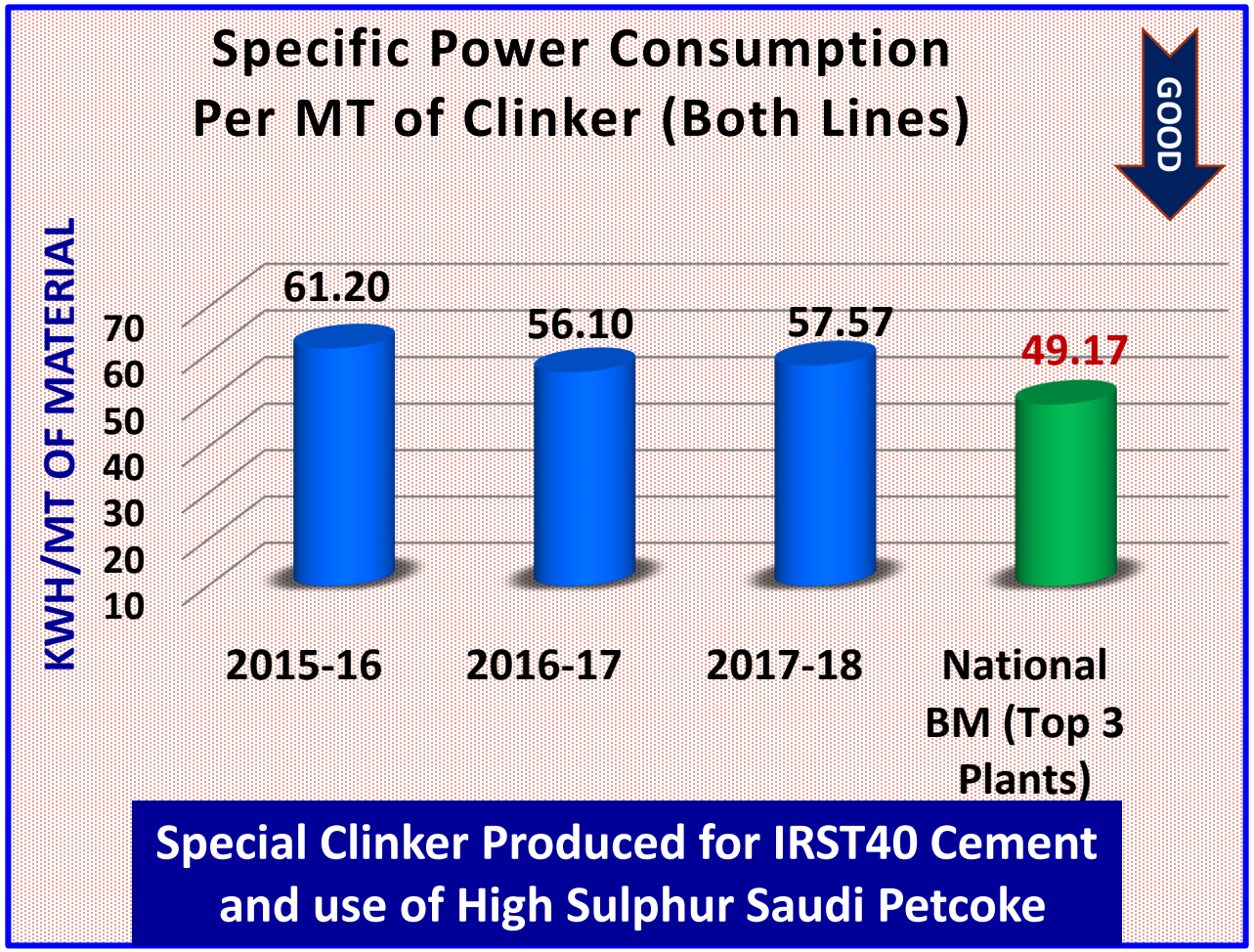
Unit's Performance

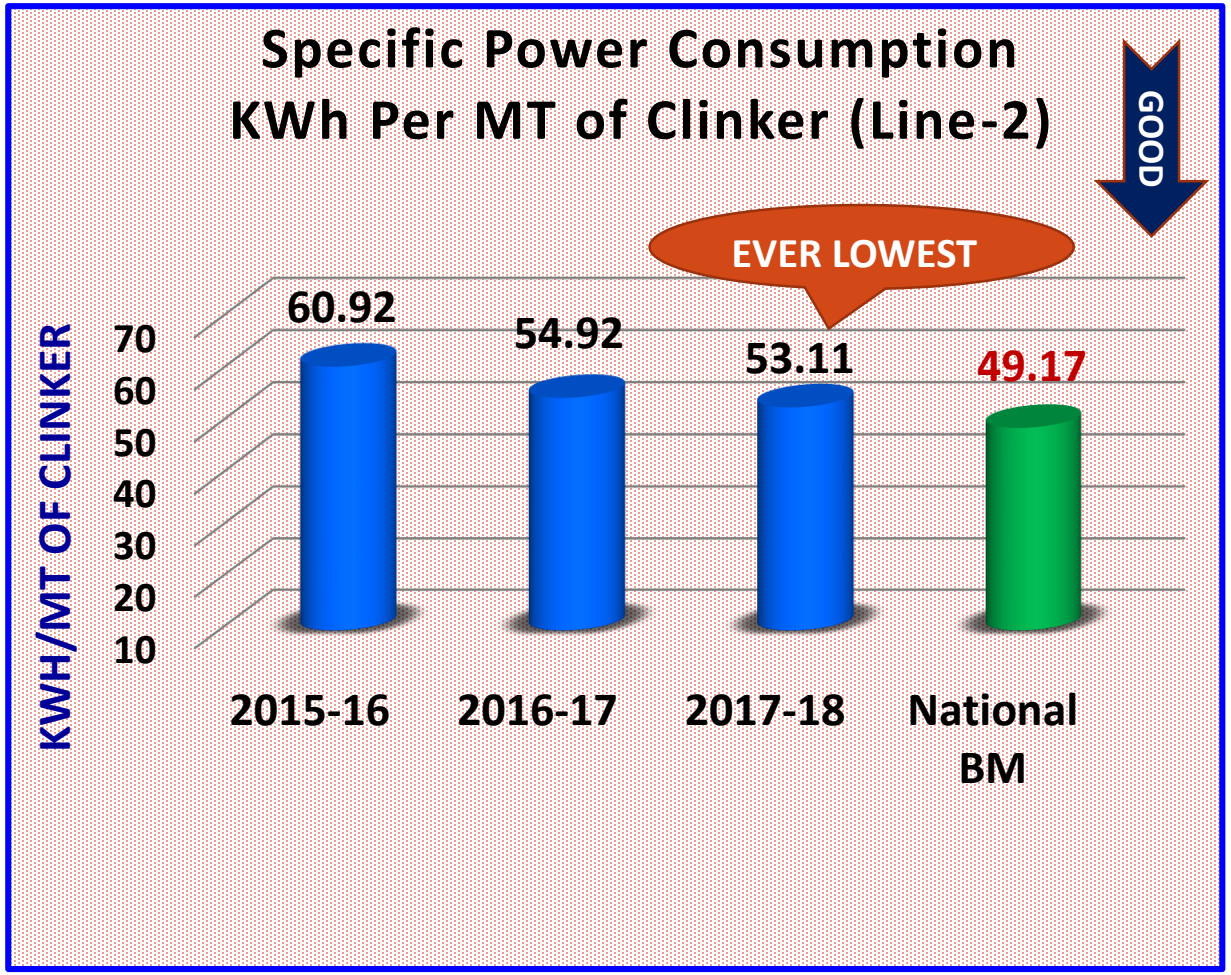




National Benchmark Reference: UTCL Corporate Data

Electrical Energy Performance

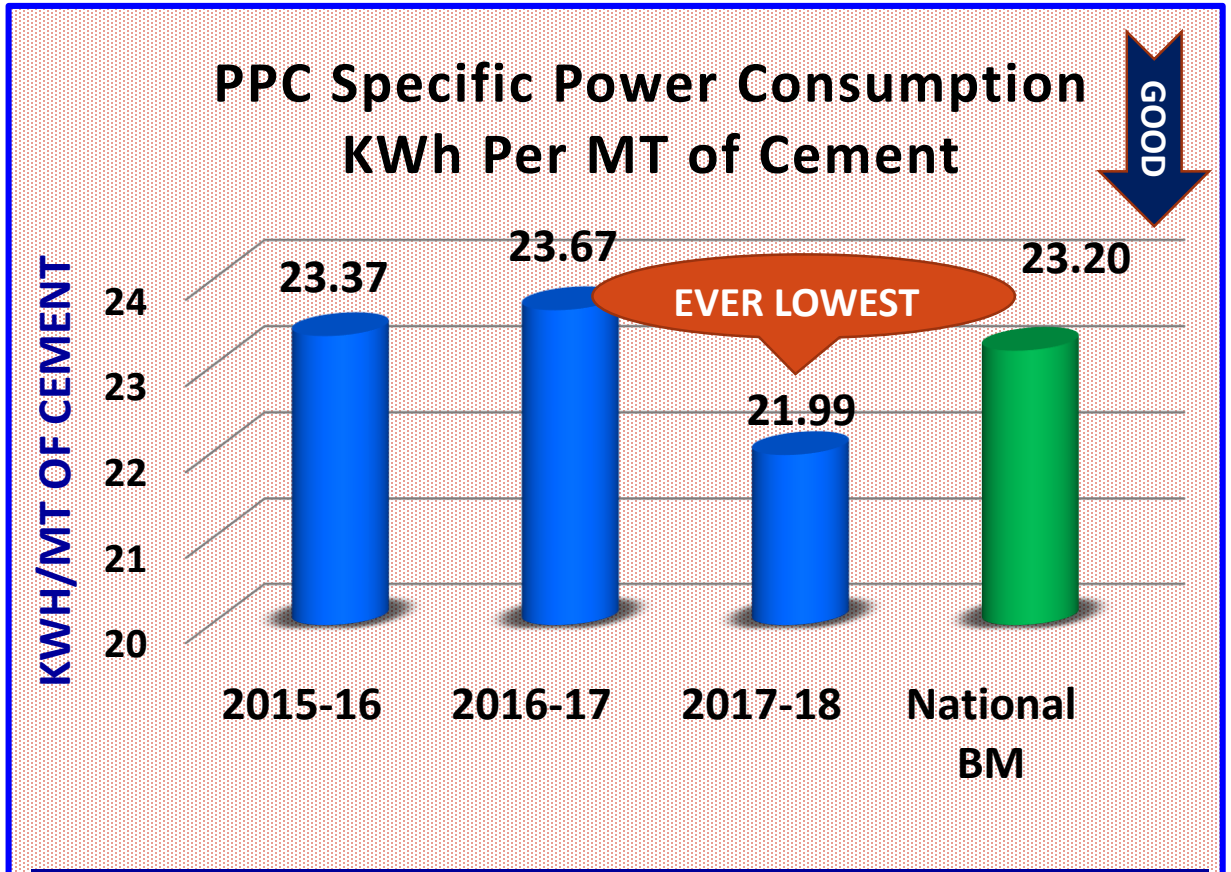




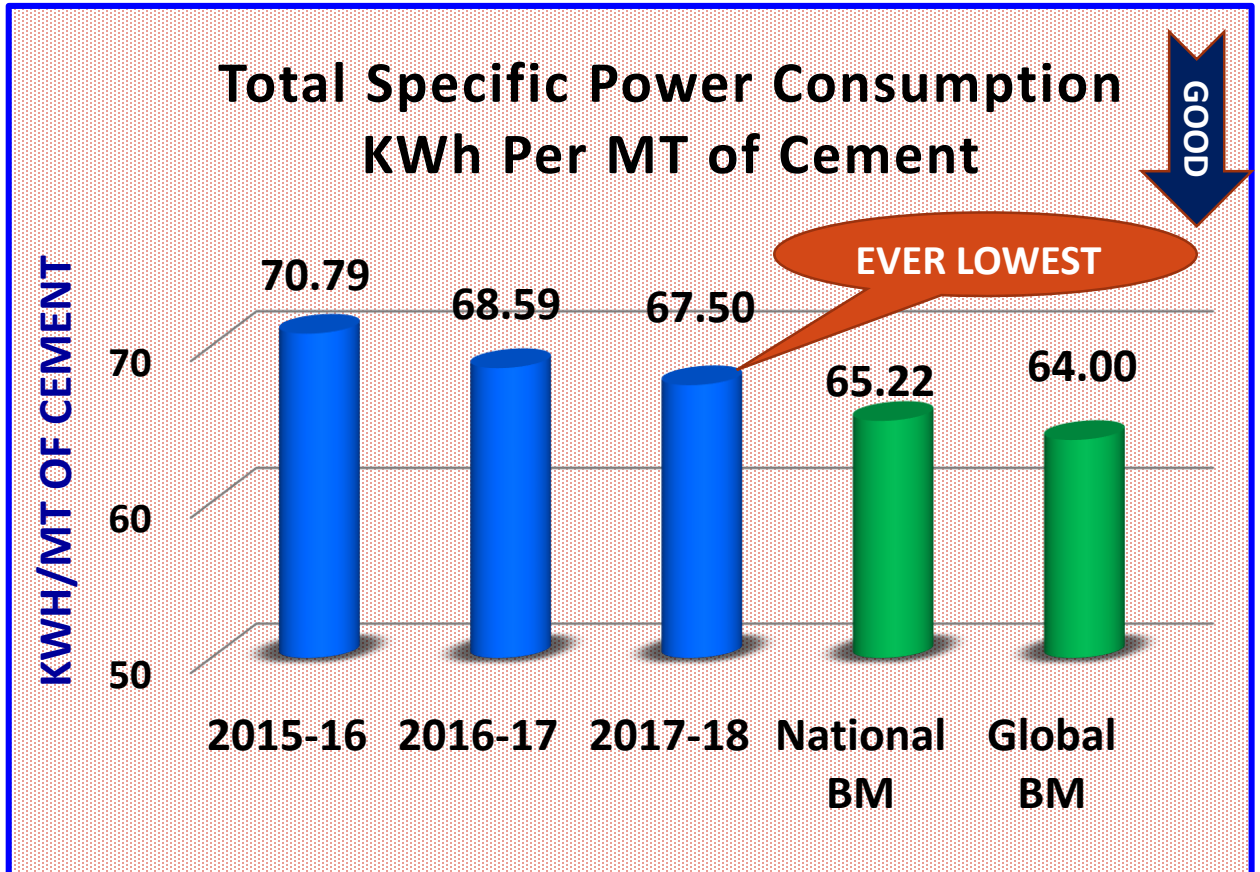
National Benchmark Reference: CII Energy Benchmarking Manual 2018, Version 3.0

Global Benchmarking: BEE presentation during interactive workshop on normalization factor in Ahmedabad

Electrical Energy Performance



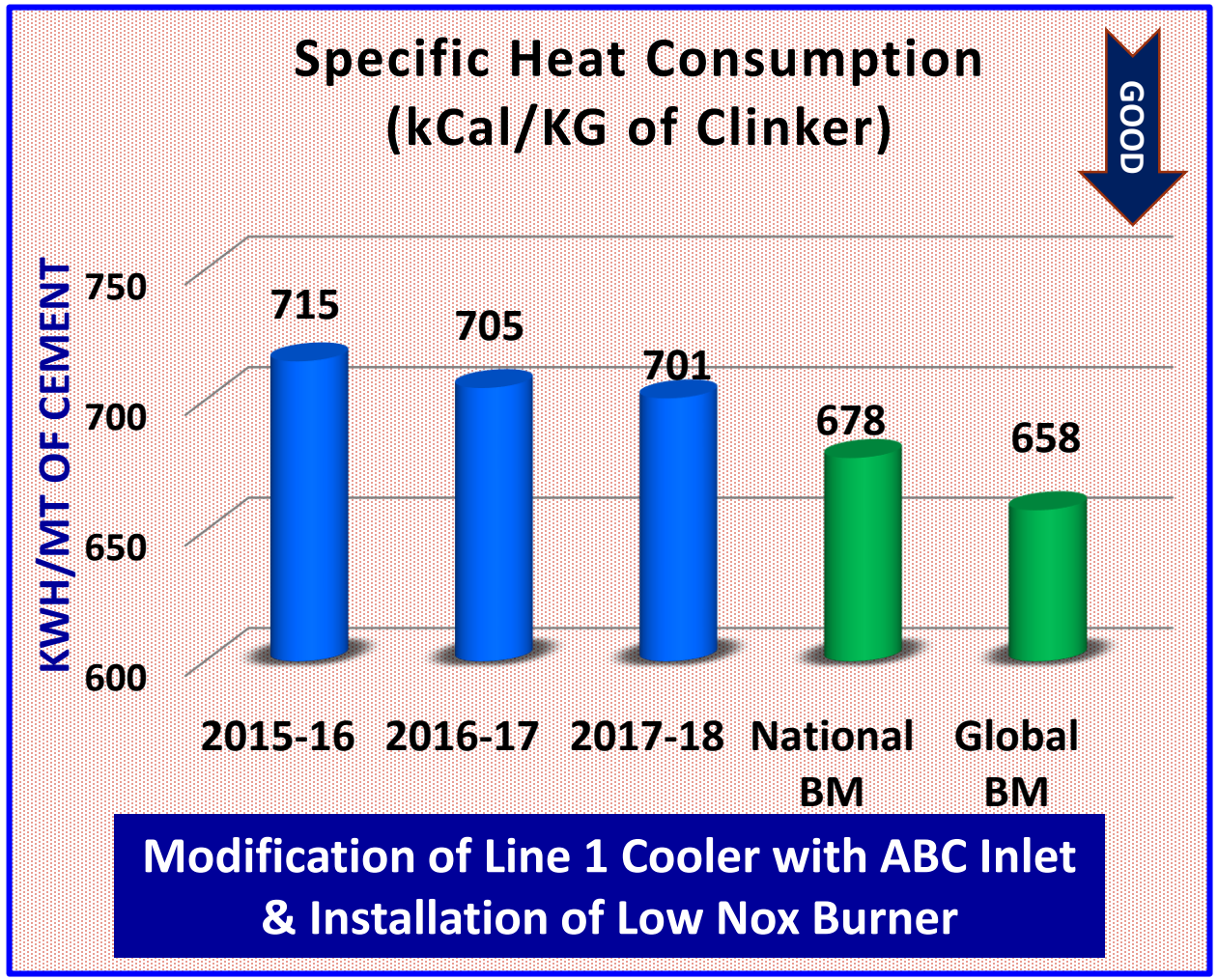
Addition of in-house Grinding Aid



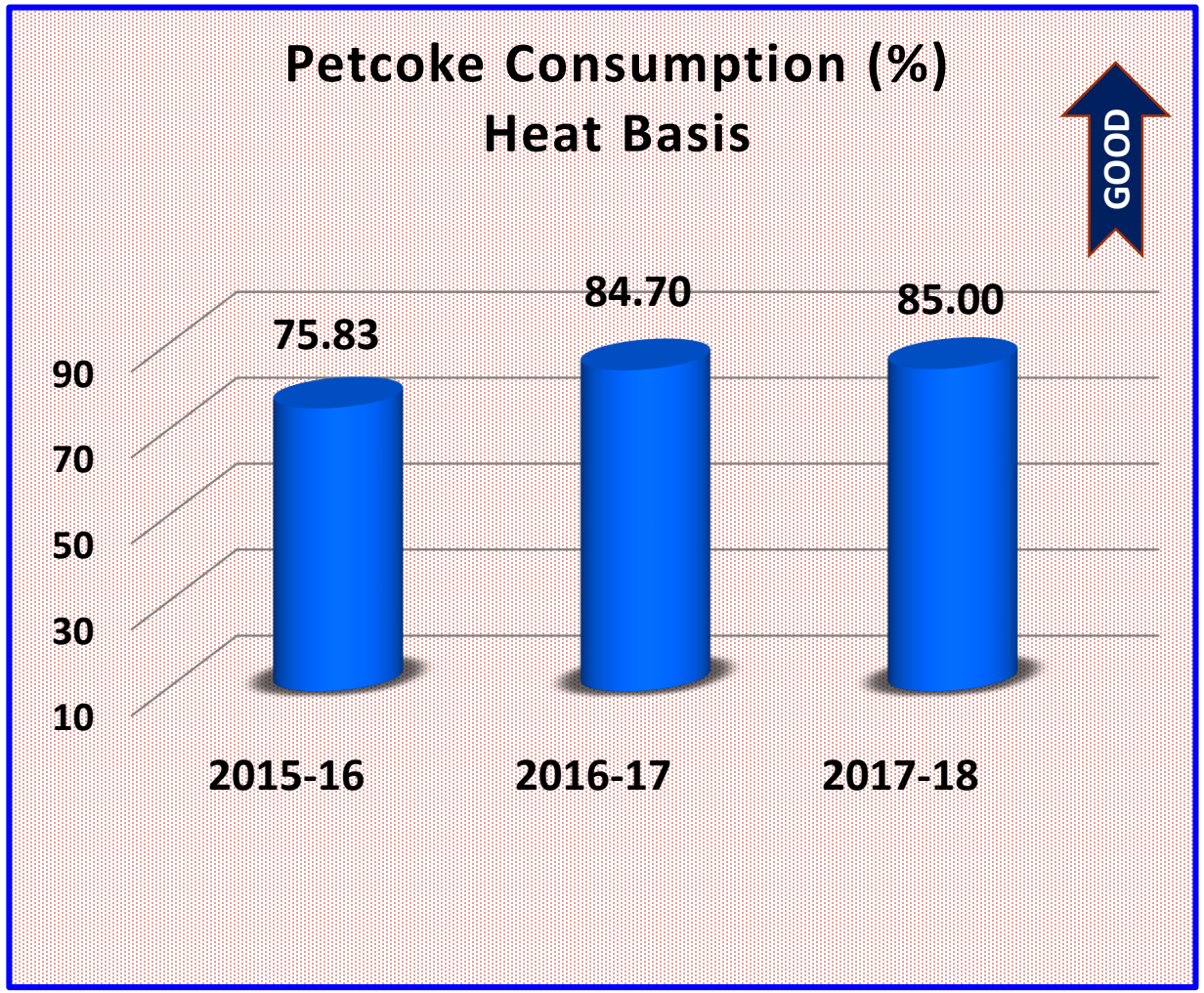
National Benchmark Reference: CII Energy Benchmarking Manual 2018, Version 3.0

Global Benchmarking: BEE presentation during interactive workshop on normalization factor in Ahmedabad

Thermal Energy Performance



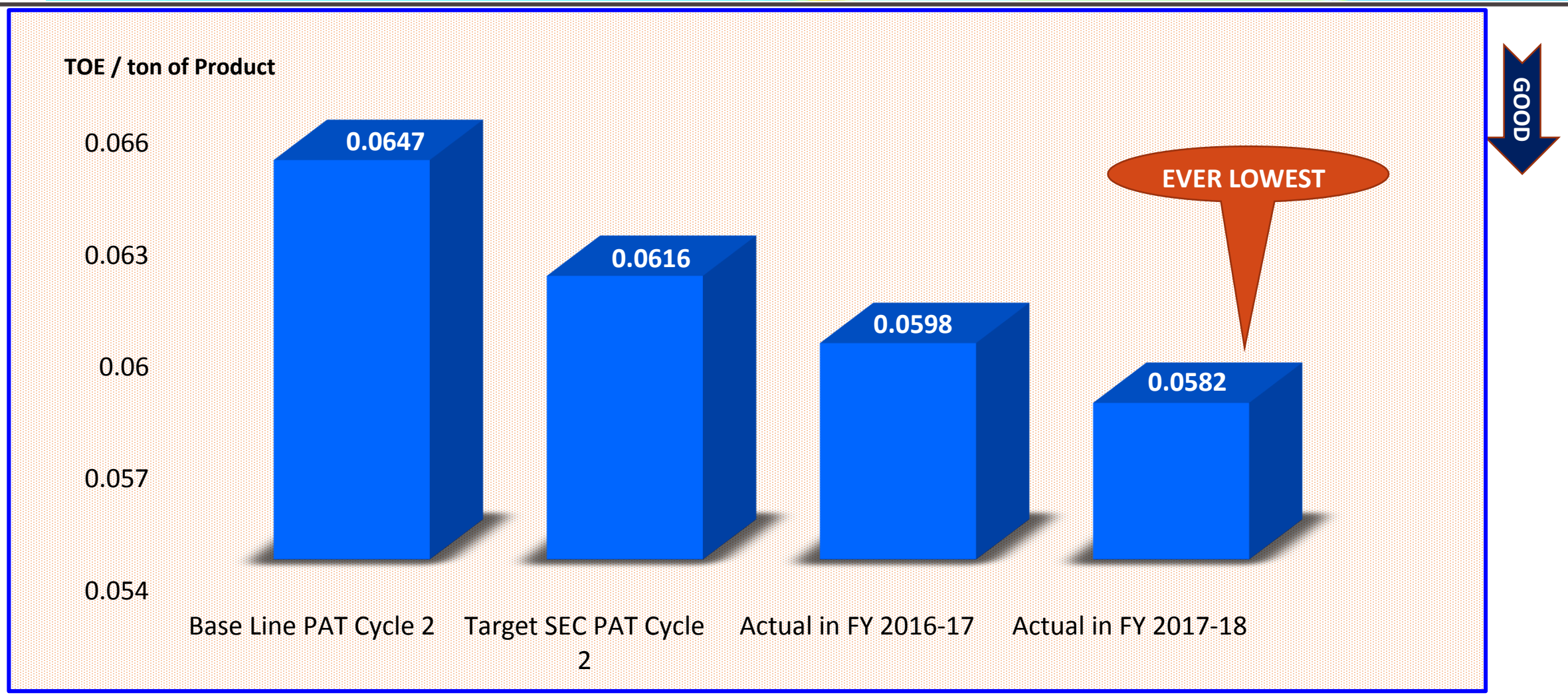
Modification of Line 1 Cooler with ABC Inlet & Installation of Low Nox Burner



SHC Values are combined for both Lines

Petcoke Consumption % of both Lines

PAT Status



Save Energy - Save Money - Save the Planet

Integrity | Commitment | Passion | Seamlessness | Speed

Innovative Projects

There is a thin line between using energy and wasting energy

Innovative Project – 1

Raw Mill Roller Press Separator Hot Air Recirculation

Objectives:

- Reduction in RABH fan Power by reducing false air across Raw Mill Separator Circuit.

Actions:

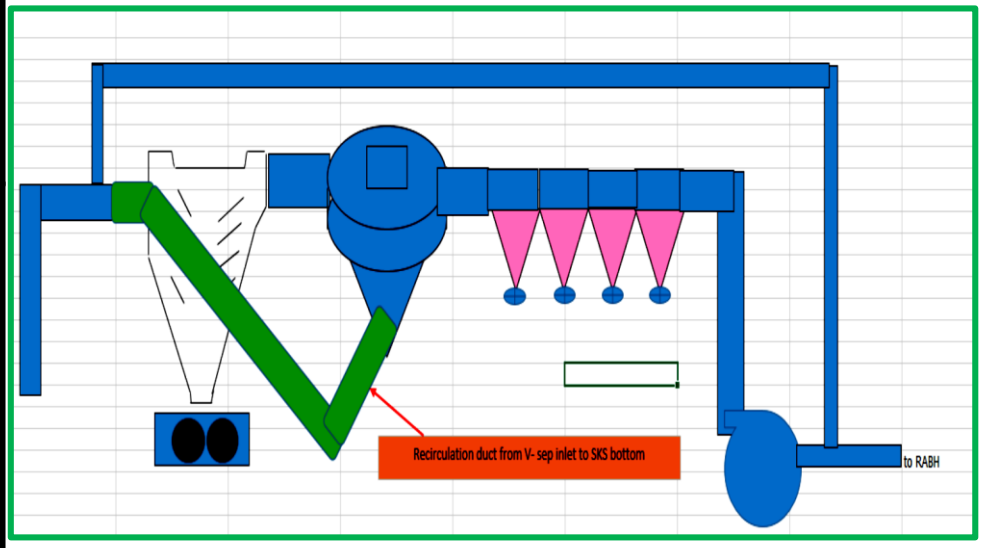
- We Studied that OEM has provided one opening at separator Bottom for better separator performance.
- A Duct connected from V. Separator Inlet to SKS bottom opening.
- Utilized system air instead of fresh air for maintaining separator performance in all 3 Roller Press circuit.
- Communicated to all UTCL Units where roller press system is installed.

Benefits:

- **Energy Savings 30.22 Lacs KWh / Annum.**
- **Separator False Air Reduced from 22.5% to 8 %**
- Fan Power Savings 0.575KWh / Mt of Clinker
- Payback in years 0.11

SKS Separator opening

SKS Separator opening Closed



Innovative Project – 2

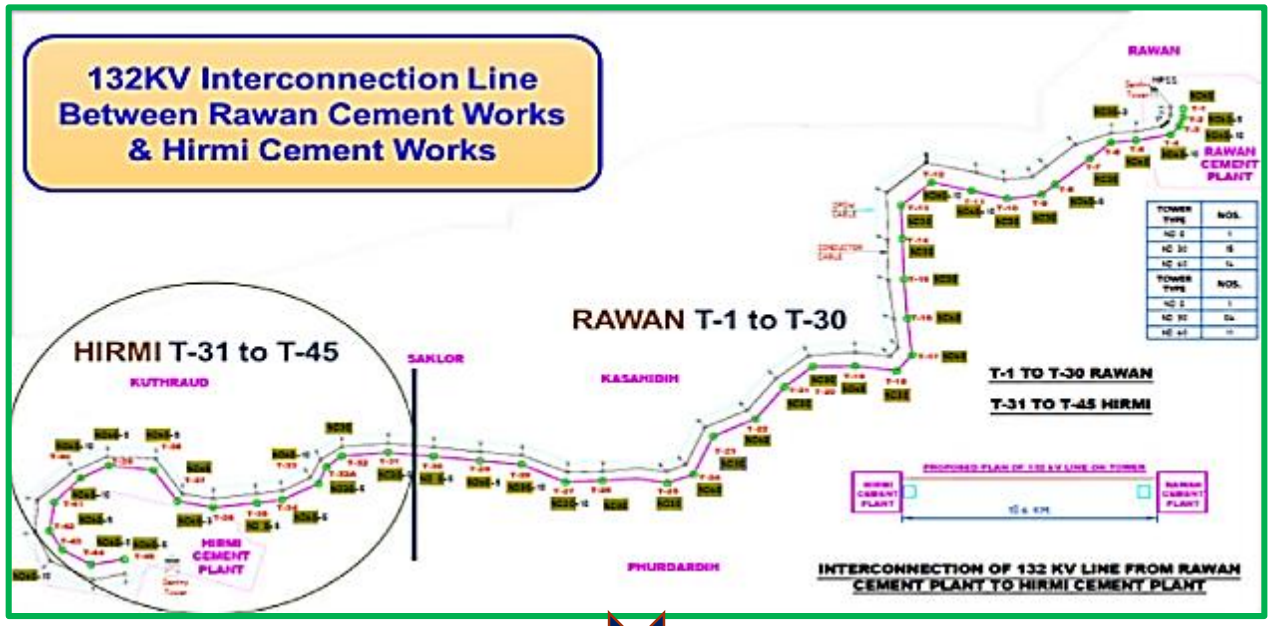
132 KV Dedicated Power Pooling

Objective:

To Reduce Auxiliary Power Consumption, Heat Rate.

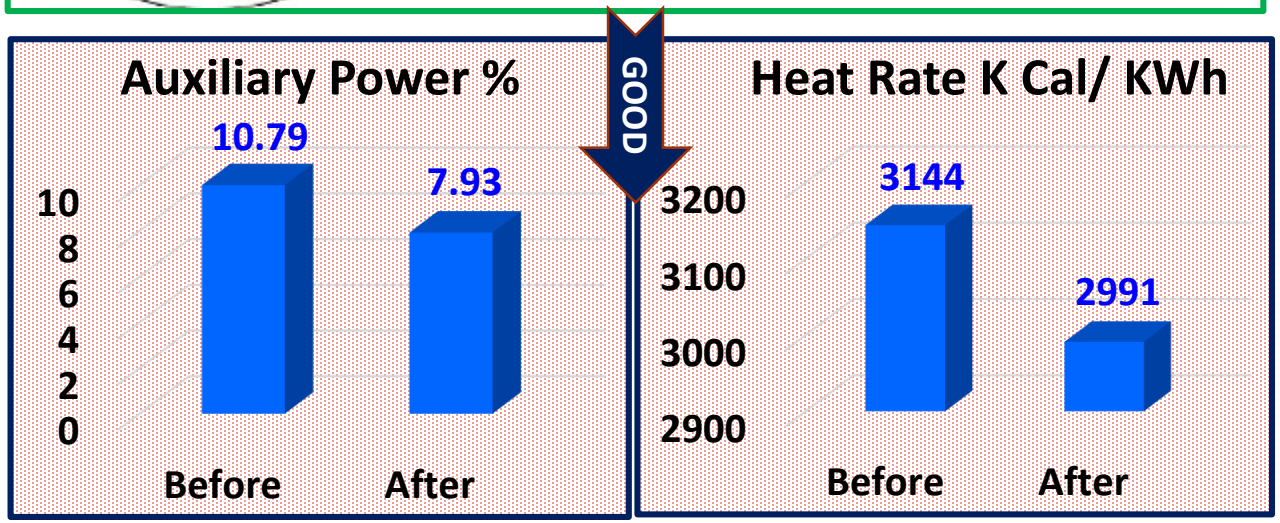
To Provide Continuous & Reliable source of Power.

Our team Emerged an innovative idea of interconnection of both plants (RWCW & HCW) through 132 KV line installation.



Benefits:

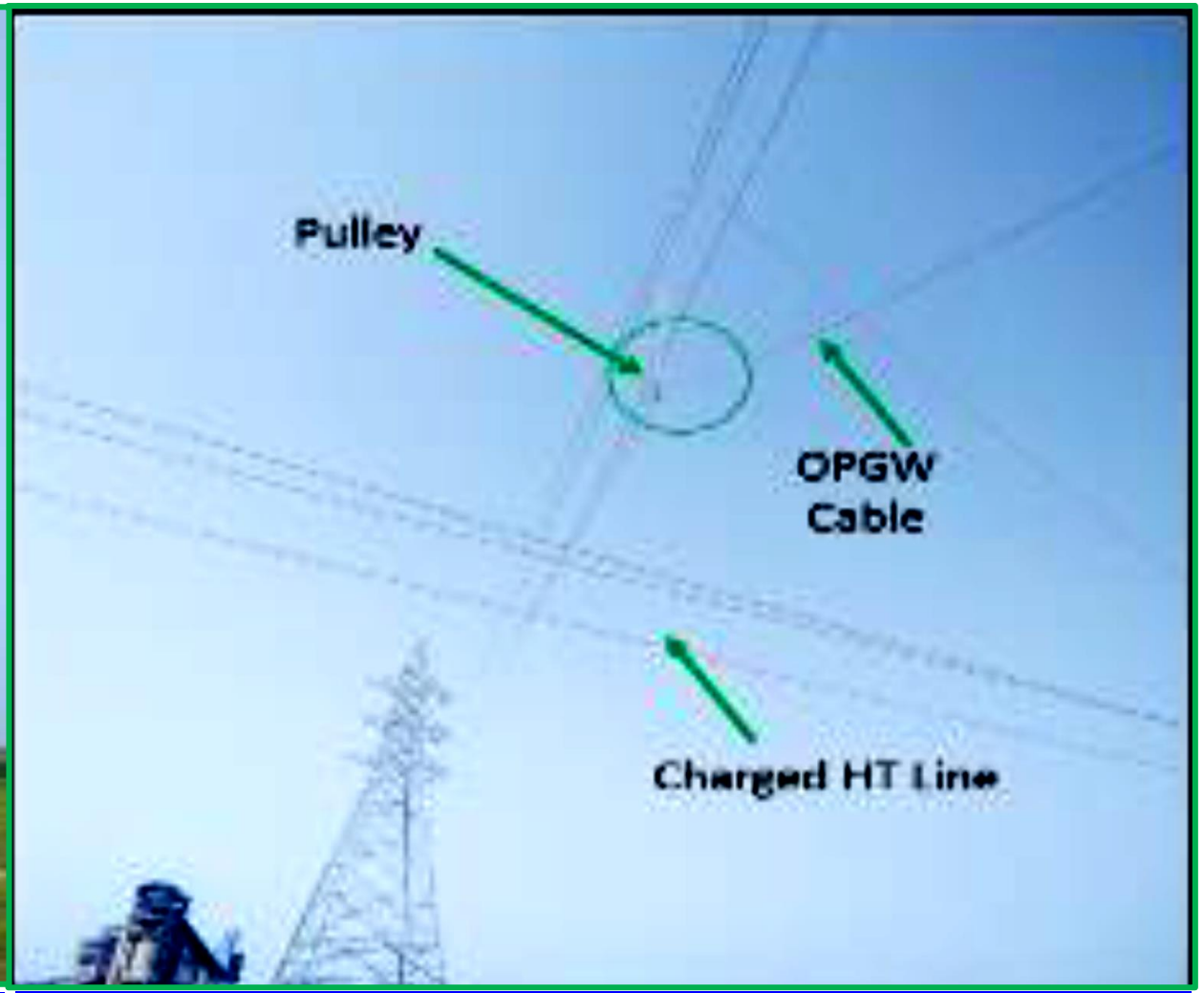
- System Reliability Improvement
- **Reduction in Auxiliary Power Consumption 10.79 to 7.93 % & Heat Rate 3144 to 2991 K Cal/ KWh**
- Stopping of 1 Power Plant & Surrendering of one grid connection.
- Improvement in PLF 69 to 93



Innovative Project – 2

132 KV Dedicated Power Pooling

45 Nos of Towers installed in span of 15 KMs



OPGW Cable laid without disturbing existing HT Line

Innovative Project – 3

ABC Inlet Installation in Line-1 Cooler

Objective:

To modify existing clinker cooler inlet with Air Blast Controlled Inlet for better Heat Recuperation

Benefits:

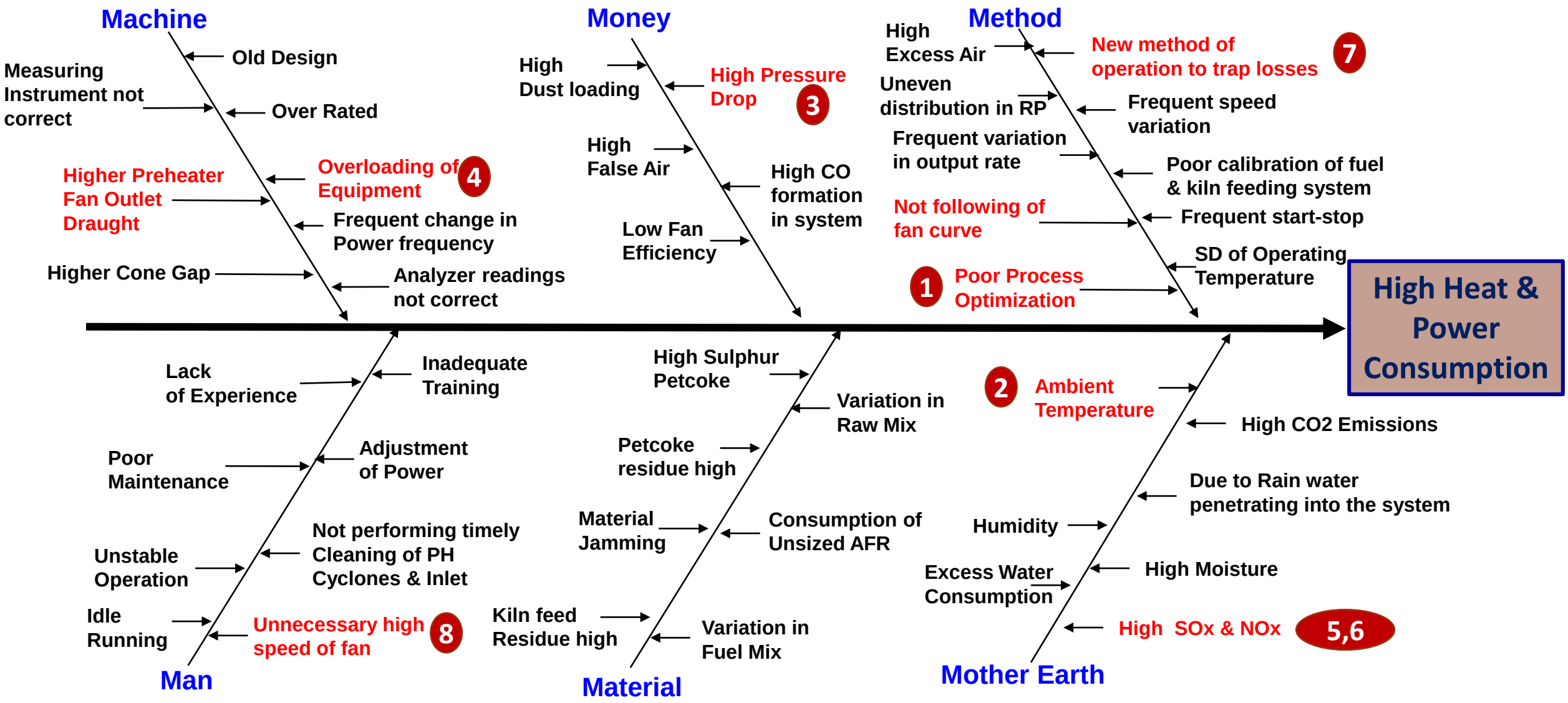
- **Energy Savings (7 kCal/kg Clinker)**
- No Snowmen
- Increased Availability
- Reduced wear on Cooler parts
- Better Operational Control
- Flexible control for better Heat Recuperation
- Proven MFR Technology

Encon Projects

Specific Power Reduction

Energy conservation is the only solution

ISHIKAWA Diagram



Integrity | Commitment | Passion | Seamlessness | Speed

Encon1-PyroClone Temperature Variation Reduction

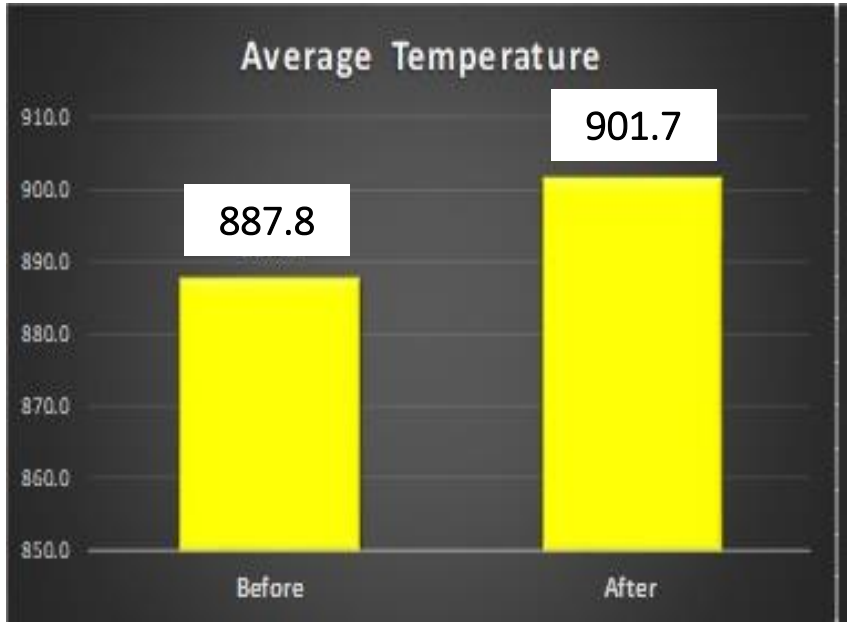
Problem:

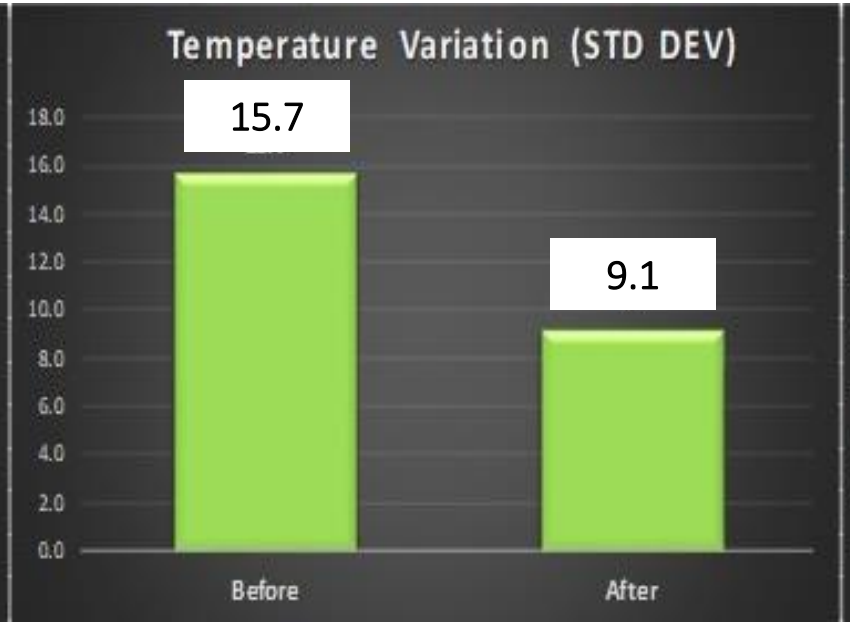
1.Process instability due to huge variation in pyroclone (calciner) temp ± 50 Deg C.
2.Variation in coal TPH.

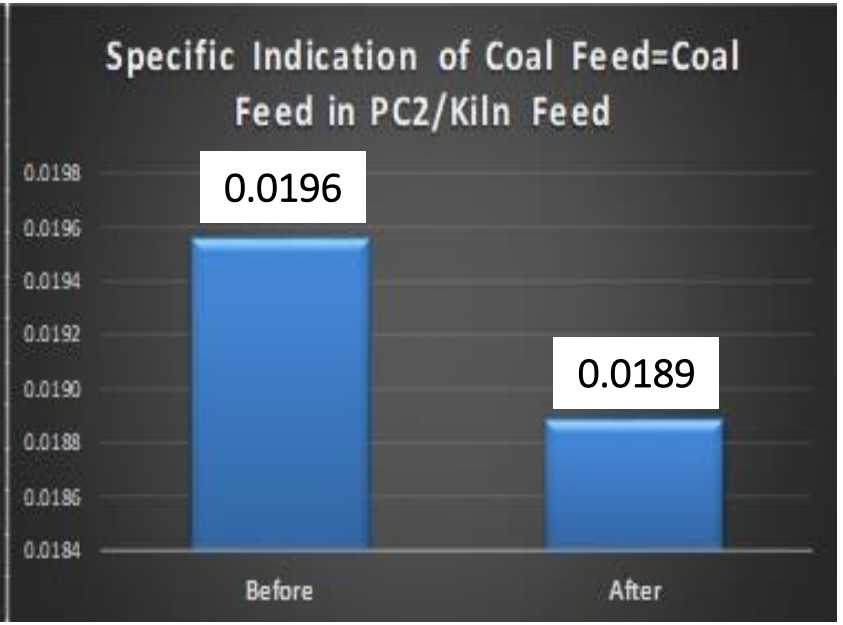
Improvement :

In-house PID Base Controlling of Pyro Clone temp. Vs Coal firing TPH to reduce variation in temperature.
1.After fine tuning it reduced to ±10 DegC
2. Better refractory life and smooth kiln operation.

482FP2 PID Data analysis







Annual Saving of 1.882 MTOE/Annum (0.396 TPH) reduction in coal feed

Encon 2-HR Painting in PH Cyclones

String-1 Stage: 2 (Cyclone)	Before	After
Areas	°C	°C
Roof	105	95
Cylindrical	82.3	73
Conical Part	74.3	62
Material Pipes	94	93
Riser	114	95
Sp. Radiation (Kcal/kg Clk)	0.72	0.53

Savings achieved in one Cyclone	0.19	kcal/ kg clk
Total Cyclones painted (04 Nos)	0.76	kcal/ kg clk
Total Heat saved/day	9120000	Kcal
NCV of Petcoke	7700	kcal/ kg Petcoke
Total Savings in Coal consumption	1.18	MT/Day
Annual Saving (Rs. Lacs)	20.91	Annually

Total Savings in Coal consumption is 390.86 MT/Annum

Encon 3-Major Fans Inlet Damper Removal

Based on high pressure drop, Following major Fans Inlet Dampers removed :

- Line-1 Raw Mill Fan
- Line-1 Coal Mill Fan
- Line-2 Roller Press 1 Separator Fan
- Line-2 Roller Press 2 Separator Fan
- Line-2 Roller Press 3 Separator Fan
- Ball Mill Close Circuit Separator Fan
- Polycom (Slag) V-Separator Fan
- Polycom (Slag) Baghouse Fan
- Polycom (Slag) Auxiliary Baghouse Fan
- Line-1 Blending Silo Top Bagfilter Fan
- Line-2 Reject & Clinker Silo Top Bagfilter Fan

Power Saving Achieved	
Line-1 Raw Mill Fan	150 kW
Line-1 Coal Mill Fan	15 kW
Line-2 RP 1 Separator Fan	15 kW
Line-2 RP 2 Separator Fan	18 kW
Line-2 RP 3 Separator Fan	22 kW
Ball Mill CC Separator Fan	70 kW
Polycom V-Separator Fan	20 kW
Polycom Baghouse Fan	12 kW
Polycom Aux. Baghouse Fan	8 kW
Line-1 Blending Silo BF Fan	15 kW
Line-2 Reject Silo Top BF Fan	9 kW
Line-2 Main Silo Top BF Fan	26 kW

Total Energy Savings in Fans Inlet Damper Removal is 380 KW

Encon 4-VFDs Installation in Plant Bagfilters

Energy conservation & Performance Improvement of all Bag filters		
S. No.	**Particulars**	**Status/Remarks**
1	Idea of Project	Energy Cell
2	Performance Monitoring	Monthly
3	Power Saving Potential	Completed
4	Capex raised for VFDs	Completed
5	19 VFDs in Phase-I	Received/installed
6	30 VFDs in Phase-II	Received/ Installed
7	49 Commissioned	Completed
8	Optimization Work	Completed
9	Project Completion Date	31.03.2018

Bag filter Optimization Report (After VFD Installation)

Microsoft Excel Worksheet

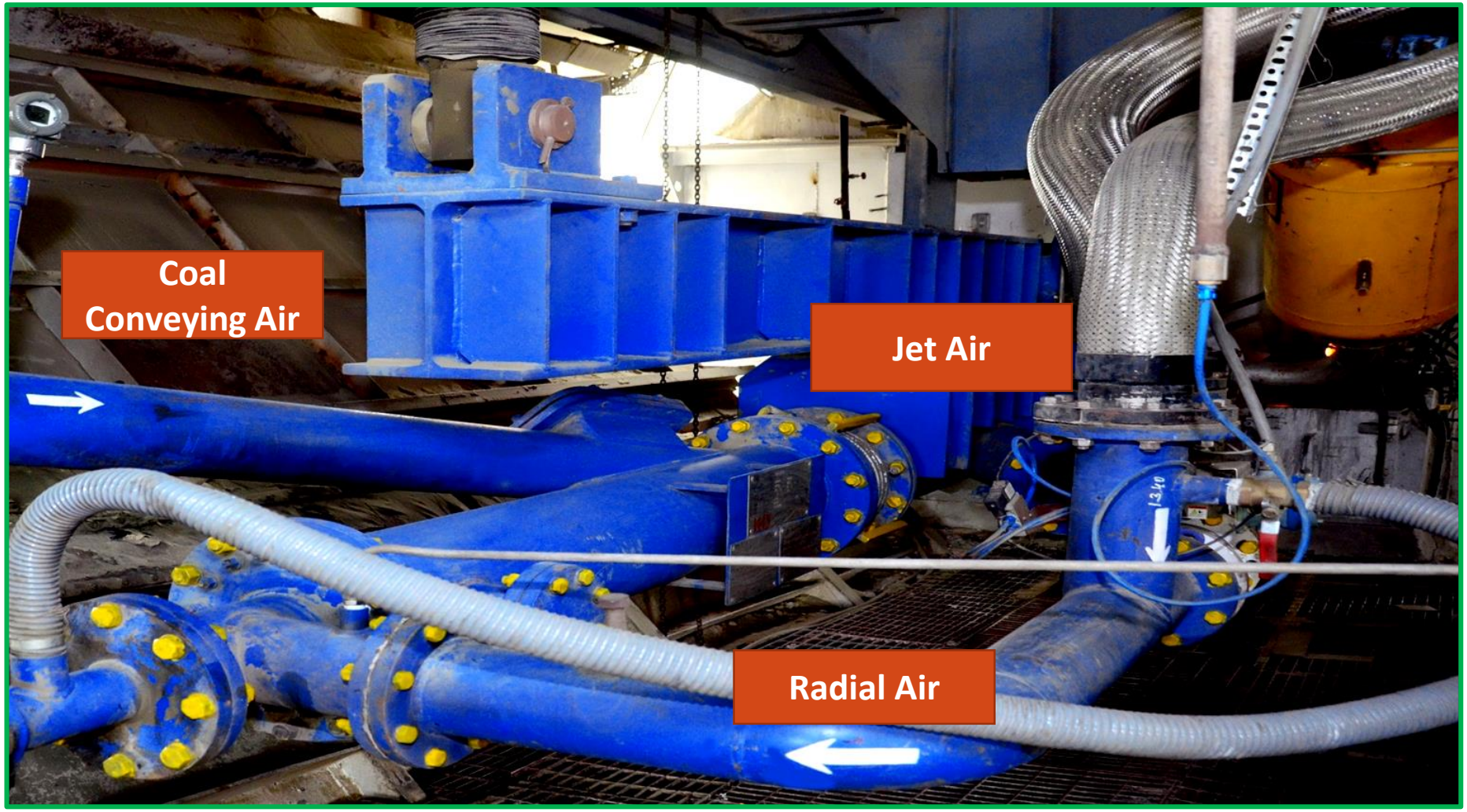
Bag filter Name	Bag filter TAG	Before		After	
		Speed	Power (kW)	Speed	Power (kW)
Line-2 Kiln Feed SFF	432BF2	100%	5.98	50%	1.53
Line-2 Kiln Feed BE & AS	432BF3	100%	8.11	70%	2.20
Line-2 PH Top Bag filter	432BF4	100%	13.21	50%	3.00
Line-2 PH Top Bag filter	432BF4	100%	13.25	50%	4.00
Total Power Consumed			**40.55**	**10.73**	
Total Power Savings Achieved			**29.82 kW in 4 Nos. BF'S**		

Total Energy Savings in 49 Bag Filters ranging 15 to 55KW is 473.2 KW

Encon 5-Low NOx Burner Installation in Line-1

Benefits:

- NOx reduction in Line1 from 950 mg/Nm3 to **650 mg/Nm3** at Kiln Inlet
- Power saving achieved **55 kW** on account of single blower operation
- Thermal energy saving on account of reduction in primary air



Total Power Savings by stopping 1 blower operation 55 KW

Encon 6-NOx Reduction Initiatives

- Line-1 Low NOx Burner Installation
- Flame momentum and Coal Conveying Air Optimization in both lines
- False air reduction in both lines
- AFR Consumption has been increased in Line-2
- Stable Kiln Operation in both lines
- Kiln feed and fine coal residue have been maintained at optimum value
- 5th Cyclone material partially diverted in upper point for all the four strings of Line-2
- Fuel splitting in Line-2 Calciner

Results Achieved as on date:

Location	Target (mg/Nm3 at 10% O2)	Before (mg/Nm3 at 10% O2)	After (mg/Nm3 at 10% O2)
Line-1 Main Stack	1000	1105	<850
Line-2 Main Stack	800	980	<780

Encon7-Insulation of Line-2 PH Top Twin Cyclones

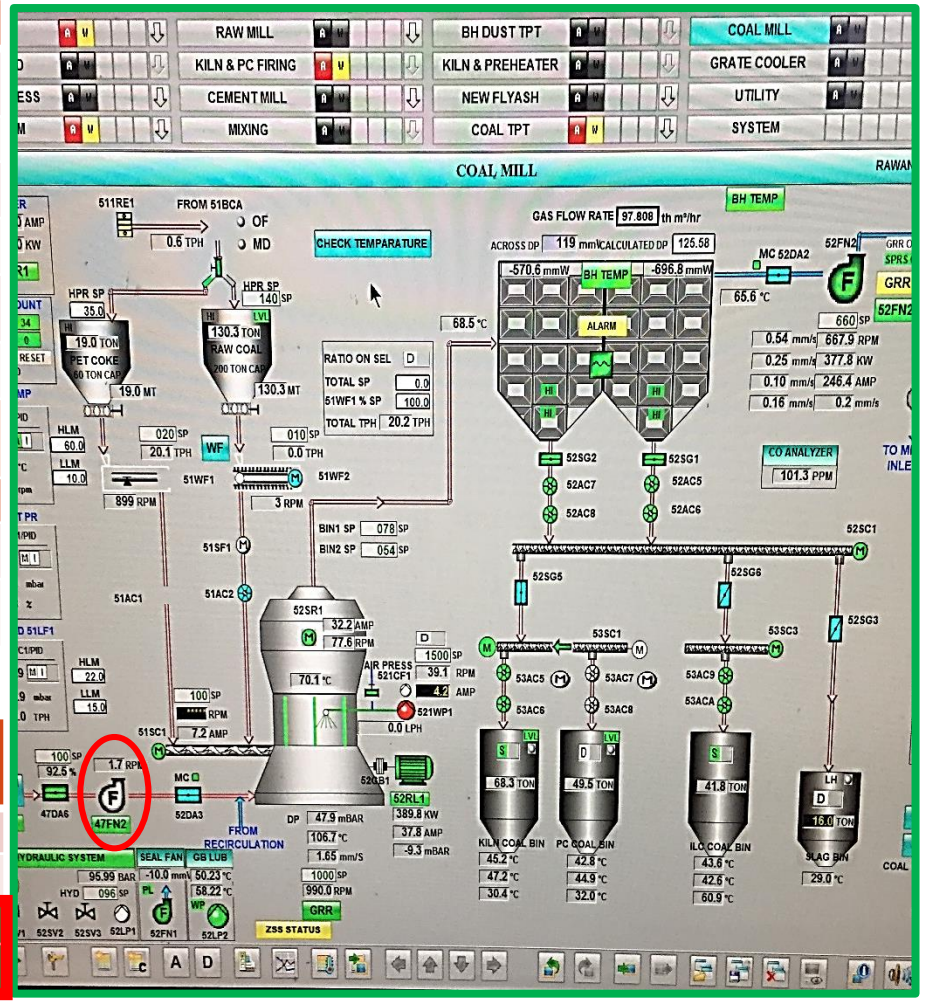
Increase in WHRS Power Generation	
Increase in Pre-heater Outlet Temp.	**6 Deg C**
Increase in Enthalpy of PH outlet Gases	3 Kcal/Kg Clinker
Increase in WHRS Power Generation	0.35MW

Total Savings on account of increase in WHRS Power Generation Rs.65lacs / Annum

Encon8-Line-1 Coal Mill Optimization

SPC Power Consumption				
	Feb-18	Mar-18	Apr-18	May-18
A.CLMILL BOOSFAN MD	0.80	0.56	0.35	0.33
D.COAL MILL FAN M D	21.84	19.87	21.40	20.15
U1:COAL MILL	44.15	41.06	45.47	43.42
TOTAL RUN HOURS	624	547	618.08	519
TPH	26	28	27	25
MILL WATER CONSUMPTION	2500 LPH	1200LPH	650 LPH	500 LPH
Total power consumption				
A.CLMILL BOOSFAN MD	12649	8648	5762	4375
D.COAL MILL FAN MD	354357	307147	352182	264697

Savings	Sp. Power Reduction/ ton of Material	TOTAL KWH / ANNUM
CLMILL BOOSFAN MD	0.47	8274
COAL MILL FAN M D	1.69	89660
TOTAL	2.16	97934
WATER SAVINGS	2000 LPH	13200KL



Reduction in water saving 13200KL /Annum & Power saving of 0.9 Lacs KW / Annum

Integrity | Commitment | Passion | Seamlessness | Speed

Benefits on account of Energy

By Various Initiatives with and without major Capex, we were able to reduce Specific Heat / Power Consumption as below

Particulars	FY 2016-17	FY 2017-18
Specific Heat Consumption	705 kCal/kg of Clinker	**701 kCal/kg of Clinker**
Total Clinker Produced	43.04 LMT	43.84 LMT
Thermal Saving	**4 kCal/kg of Clinker**	
Monitory Saving	**₹ 198.4 Lakhs/Annum**	

Total saving = 296.69 Lacs/Annum (Saving in Power)
+ 198.4 Lacs/Annum (Saving in Thermal)

₹ 495.09 Lacs/Annum for FY 2017-18

Replicability of Encon Projects

- Line 1 Coal Mill Cyclone Removal to reduce excess pressure drop & energy saving

RWCW → Dhar Cement

- Raw Mill Roller Press Separator Hot Air Recirculation

RC-IV → RWCW – II → Plants with Roller Press Circuit in Raw Mill & OEM

- Parallel kiln firing pipe line for petcoke of size 250 NB (reduced from 300NB)

RWCW – II → RC-III → Planned at AC

Journey Towards Excellence Continues…

Energy Conservation Projects 2015-16

Save Today – Survive Tomorrow

Energy Conservation Projects 2015-16

S.No.	Energy Saving Tasks	Annual Energy Savings		Savings (Lacs/Annum)
		Electrical (kWh)	Thermal (MTOE)	
1	Instrument Air Consumption optimization by Interconnection of Instrument Compressors of Line # 01 & Line # 02	316800	-	14.20
2	Install EE pump of 200 m3/hr and 30 M head at WHRB in place of existing ACW pump	257416	-	11.60
3	Removal of Louver damper in Roller Press Separator fans in line-2	495000	-	22.22
4	Removal of Louver damper in Preheater fans in line-2 (4 Nos)	660000	-	29.60
5	LED street lights Installation	8773	-	0.33
6	Optimization of Dilution Air Fan in Line-2 RABH Section	494672	-	18.79
7	Stopped the Hotbin Bucket elevator and Transport system by Providing a By Pass Conveyor system	173135	-	6.57
8	Energy saving in reducing Idle Running of Line-1 & 2 RAL for Raw mill Transport system with Logic Modification	110774	-	4.20
9	8 Nos Bagfilters of Line-2 Coal transport system had been stopped	190852	-	7.25

Energy Conservation Projects 2015-16

S.No.	Energy Saving Tasks	Annual Energy Savings		Savings (Lacs/Annum)
		Electrical (kWh)	Thermal (MTOE)	
10	Replacement of W/T-1 water spray pump motor from 18.5 kw to 9.3 kw	19800	-	0.75
11	One compressor stopped among 4 compressors for line-2 process operation after arresting the leakages	1188000	-	45.14
12	High mast towers convention lights were replaced by LED	19833	-	0.75
13	Installation of VFD in all ACC fans, BFP, ACW	2958450	-	35.50

Energy Conservation Projects 2016-17

Energy conserved is Energy produced

Energy Conservation Projects 2016-17

S.No.	Energy Saving Tasks	Annual Energy Savings		Savings (Lacs/Annum)
		Electrical (kWh)	Thermal (MTOE)	
1	Manufacturing of Green Clinker in both lines	1578067	-	63.10
2	Single bucket elevator operation for Line 2 Raw Meal feed	576198	-	21.89
3	Line-2 Cooler ESP Stack Height Increased By 10 M	494678	-	18.79
4	Line-2 Preheater Fans Inlet Modification	772934	-	29.37
5	LED lights in Plant	10205	-	0.38
6	Heat resistant Painting in line-2 top cyclones	-	0.000211	
7	Insulation fixing work in line-2 top cyclones	-	0.000256	
8	Kiln RABH RA Fan (422FN3) damper removed and PID based operation w.r.t. RABH DP	309174	-	11.74
9	Cooler ESP RAL-16 nos motor intermittent stopping of RAL for power reduction	63360	-	2.40

Energy Conservation Projects 2016-17

S.No.	Energy Saving Tasks	Annual Energy Savings		Savings (Lacs/Annum)
		Electrical (kWh)	Thermal (MTOE)	
10	Line-1 Coal Mill Fan Inlet Damper Removal	297660	-	11.31
11	Line-1 Raw Mill Fan Inlet Damper Removal	363000	-	13.79
12	Ball Mill Close circuit separator fan inlet damper removal	376200	-	14.30
13	Slag Mill V-Separator fan inlet damper removal	281952	-	10.70
14	Slag Mill main & auxiliary Baghouse fans inlet damper removal	217800	-	8.27
15	Removal of clinker silo bag filter damper & installation of DP transmitter to regulate the fan speed with VFD in PID loop.	556512	-	21.14
16	Parallel kiln firing pipe line for petcoke of size 250 NB (size reduced from existing 300 NB to 250 NB), to reduce the transport air quantity & in turn power consumption.	309174	-	11.74
17	Crusher main bag filter damper removal & intermittent stoppage of bag filter material transport ckt. i.e. (2 nos screw conveyor)	264000	-	10.03
18	VFD installation at bag filter fan 332 FN1 & 332FNC	145200	-	5.51

Energy Conservation Projects 2016-17

S.No.	Energy Saving Tasks	Annual Energy Savings		Savings (Lacs/Annum)
		Electrical (kWh)	Thermal (MTOE)	
19	RP-1 V separator modification (increase in guide vanes height to increase material retention time and to improve air flow).	2627976	-	99.86
20	RP-1 feed gate zero position adjustment.			
21	Raw mill hopper feeding system modification to improve/ balance segregation.			
22	Logic modification in RM transport circuit to eliminate idle running of equipment	1082095	-	41.11
23	Logic modification in RM additive hopper feeding circuit to eliminate idle running of equipment	772925	-	29.37
24	DP point relocation to optimize PH outlet draft and to reduce RABH fan power	927521	-	35.24
25	Increase in crusher output up to 1800 TPH & reduction in idler running of Equipments	927520	-	35.24
26	Stopping of seal air fan after 2 hrs stoppage of line-1 Raw Mill	6878	-	0.26

Energy Conservation Projects 2016-17

S.No.	Energy Saving Tasks	Annual Energy Savings		Savings (Lacs/Annum)
		Electrical (kWh)	Thermal (MTOE)	
27	Orifice removal from line-2 coal mill fan duct	61835	-	2.34
28	Reduction of Pressure drop in downcomer duct of line-2	6449896		319.26
29	Arresting of air leakages in line-1 coal mill circuit	1238926		61.32
30	Arresting of air leakages in line-1 PH Calciner circuit	918720		45.47
31	Arresting of air leakages in line-1 ILC circuit	1573704		77.89
32	Arresting of air leakages in line-1 kiln string	148896		7.37
33	Arresting of air leakages in line-2 Roller Press Circuit (3 nos.)	10585080		523.96
34	Arresting of air leakages in line-2 coal mill circuit	1386000		68.60
35	Arresting of air leakages in line-2 PH circuit (String 1&2)	5513112		272.89
36	Arresting of air leakages in line-2 PH circuit (String 3&4)	6443712		318.96

Energy Conservation Projects 2016-17

S.No.	Energy Saving Tasks	Annual Energy Savings		Savings (Lacs/Annum)
		Electrical (kWh)	Thermal (MTOE)	
37	Arresting of air leakages in line-1 Raw Mill Circuit	2198592	-	108.83
38	Installation of EE pump of 450 m3/hr & 35 M head in place of WP 7/8	316008	-	15.64
39	Installation of PID based VFD at one compressor of line-2	245520	-	12.15
40	Slag feeding circuit modification & Extension of 611BC-3	145200	-	5.51
41	Running of stand by Blower 681BL6 stopped	49896	-	1.89
42	Improved the Generator terminal power factor from 0.91 to 0.95	-	-	48.19

Energy Conservation Projects 2017-18

A thing which burns never returns

Energy Conservation Projects 2017-18

S.No.	Energy Saving Tasks	Energy Savings		Savings (Lacs/Annum)
		Electrical (kWh)	Thermal (MTOE)	
1	ABC Inlet modification in line-1 Cooler	-	0.001067	143.7
2	49 nos VFD installed in Bagfilters (>15 kW) and PID based operation after inlet damper removal	1980000	-	68.3
3	3 Nos. VFD installation inline-1 Cooler fans	178200	-	6.1
4	3 Nos. VFD installation inline-1 Coal firing blower	311256	-	10.7
5	Installation of EE pump of 350 m3/hr & 60 M head in place of WP 14B pump	340243	-	11.7
6	Installation of EE pump of 200 m3/hr & 50 M head in place of WP 15B pump	272842	-	9.4
7	Installation of EE pump of 50 m3/hr & 50 M head in place of WP12	51181	-	1.8
8	Replacement of existing ELGI 821CP1 compressor with EE compressor in line-1	369468	-	12.7
9	Hot Air Recirculation connection from V Separator to seal air pockets at SKS separator bottom of line-2 Roller Press (3 Nos)	3022284	-	104.3
10	Line-1 Kiln Burner Replacement with low Nox burner	-	0.000342	3.9

Energy Conservation Projects 2017-18

S.No.	Energy Saving Tasks	Energy Savings		Savings (Lacs/Annum)
		Electrical (kWh)	Thermal (MTOE)	
11	Installation of dedicated power line between RWCW and HCW	-		57.3
12	Installation of VFD at 821CP4 compressor to save unload power in line-1	129730		4.5
13	Installation of VFD at 341CP3 compressor to save unload power in line-1	429660		14.82
14	Parallel kiln firing pipe line for petcoke of size 250 NB (size reduced from existing 300 NB to 250 NB), to reduce the transport air quantity & in turn power consumption.	66000		2.28
15	Cooler ESP RAL-16 nos. motor intermittent stopping of RAL for power reduction.	39600		1.37
16	Crusher main bag filter damper removal & intermittent stoppage of bag filter material transport ckt. i.e. (2nos screw conveyor).	231000		7.97
17	DP point relocation to optimze PH outlet draft and to reduce RABH fan power	990000		34.16
18	Orifice removal from coal mill fan duct	66000		2.28
19	Line-1 kiln String Top Cyclone Modification		0.000446	5.05
	Total Savings			502.39

Ongoing Projects 2018-19

Energy Conservation for the Future Generation

Ongoing Encon Projects 2018-19

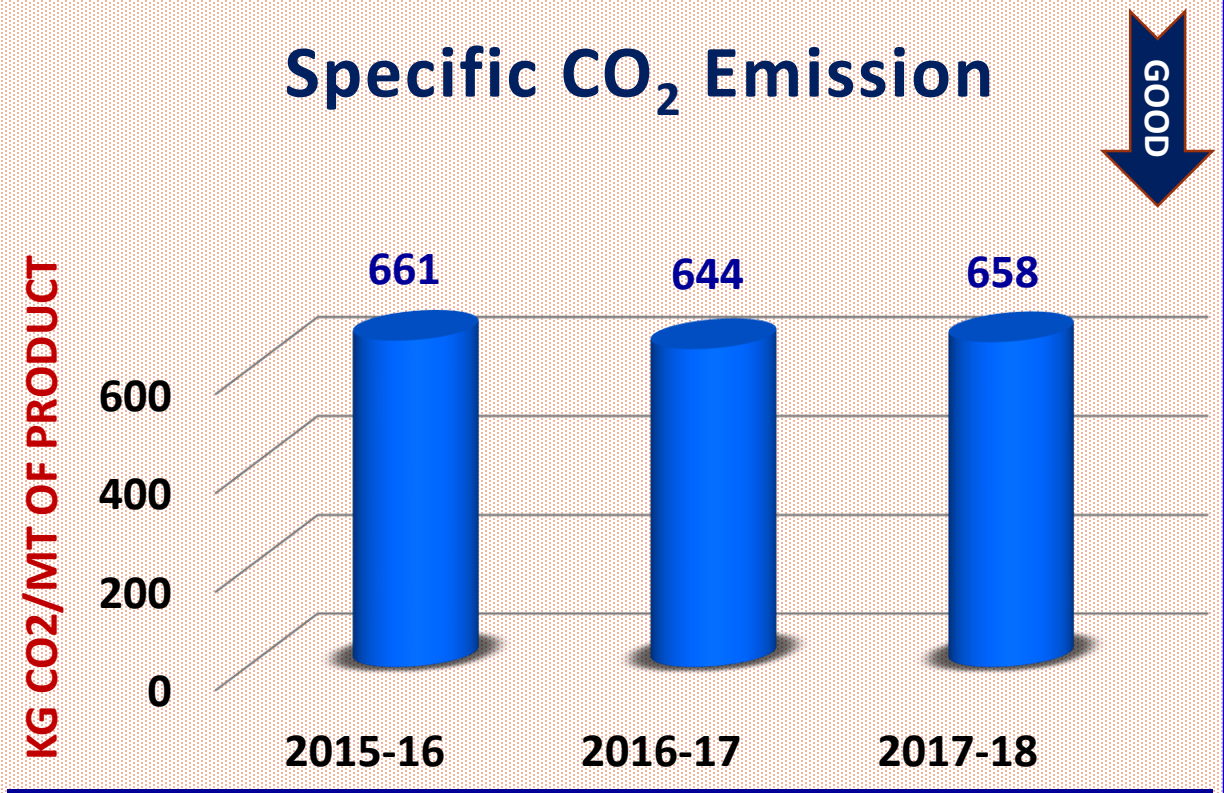
S.No.	Energy Saving Tasks	Energy Savings		Capex Required (Rs. Lacs)	Target
		Electrical (kWh)	Thermal (MTOE)		
1	Line-1 Coal Mill Cyclones are to be removed to reduce excess pressure drop	726000		10	Completed
2	Line-1 Cooler Chimney Height Extension by 15.0 meter	396000		30	March'19
3	Replacement of 5 Nos separator & Main Bag house fans impellers Cement Mill(Cement Mill 0.78+0.08+Slag Mill1.21kwh / Ton material	2466000		183	Dec'18
4	Installation of High Efficiency Separator L-1 Coal Mill - 0.38kw/ton material or 10KWH	46532.9		25	March'19
5	Line 1 Kiln Pressure drop reduction in cyclone 1 of PC String 0.62KW/ton Material	1104840		-	March'19
6	Energy Saving by improving static efficiency of PC String & Kiln String Fan 0.86kw/ton material	1532520		-	Dec'18
7	Line 2 Kiln Energy Saving by dip tube modification of top cyclone (double d Modification) 0.30KW/ton	1039500		24	Completed
8	Replacement of conventional Lights with LED - 0.01kwh/ton clnk	52470		20	March'19

Ongoing Encon Projects 2018-19

S.No.	Energy Saving Tasks	Energy Savings		Capex Required (Rs. Lacs)	Target
		Electrical (kWh)	Thermal (MTOE)		
9	Line 2 RM Fan Inlet Box Modification	1336895		5	Completed
10	Line 2 Coal Mill Fan Inlet Box Modification	297266		5	Completed
11	Ball Mill Liner Replacement with Ultrathin Classifying Liner	750000		250	March'19
12	Expert Optimizer Cement Mill	750000	-	200	March'19
13	Advanced Process Control (APC) in TPP	-	0.000658	80	Dec'18
14	Low Pressure Compressor For Fly ash Unloading	100000		25	Dec'18
15	Hot Air Recirculation in Line 1 Cooler to increase WHRS Power	2376000		200	March'18
	Total Investment in Encon Projects	12974024	0.000658	1057	

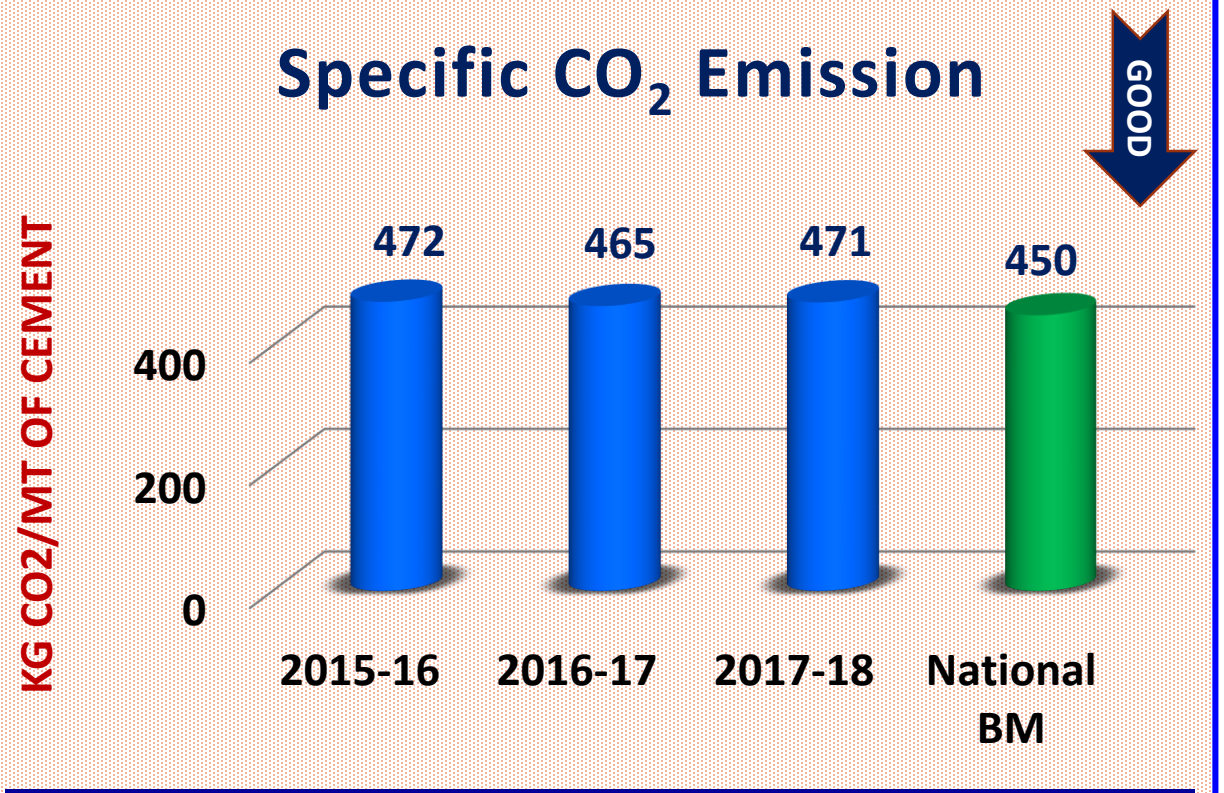
GHG Inventorization

Specific CO_2 Emission



For Cementitious Product –
Increased Clinker Production

Specific CO_2 Emission



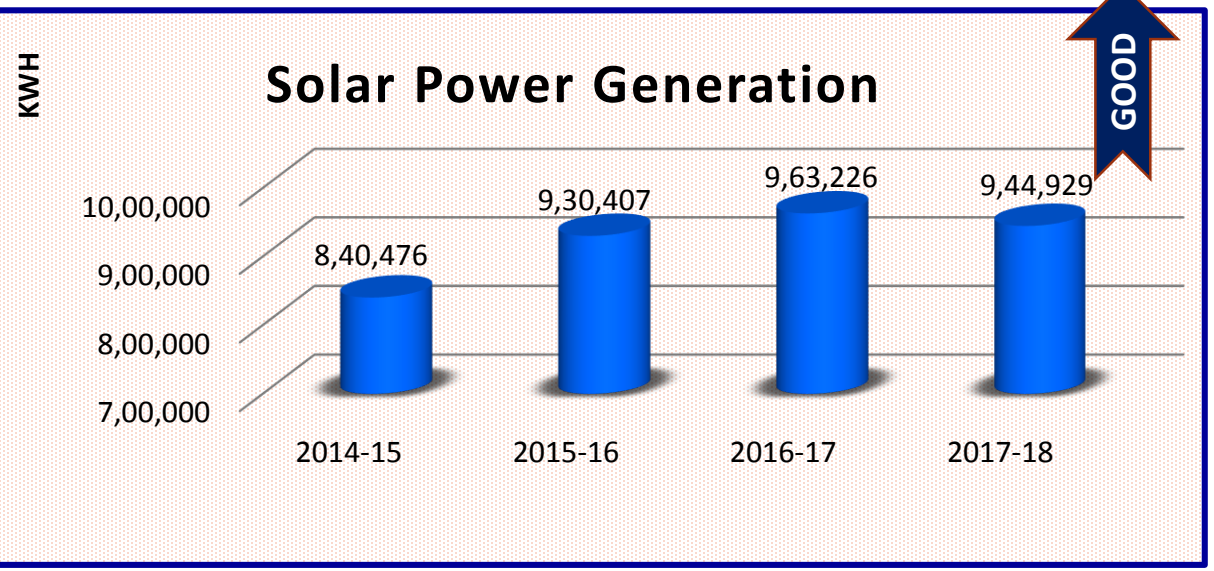
Reduction of Conversion factor from 1.72 to 1.67
due to production of IRST 40

*** Lowest Carbon Footprints/Specific Emissions among all UltraTech plants**

Renewable Energy Use

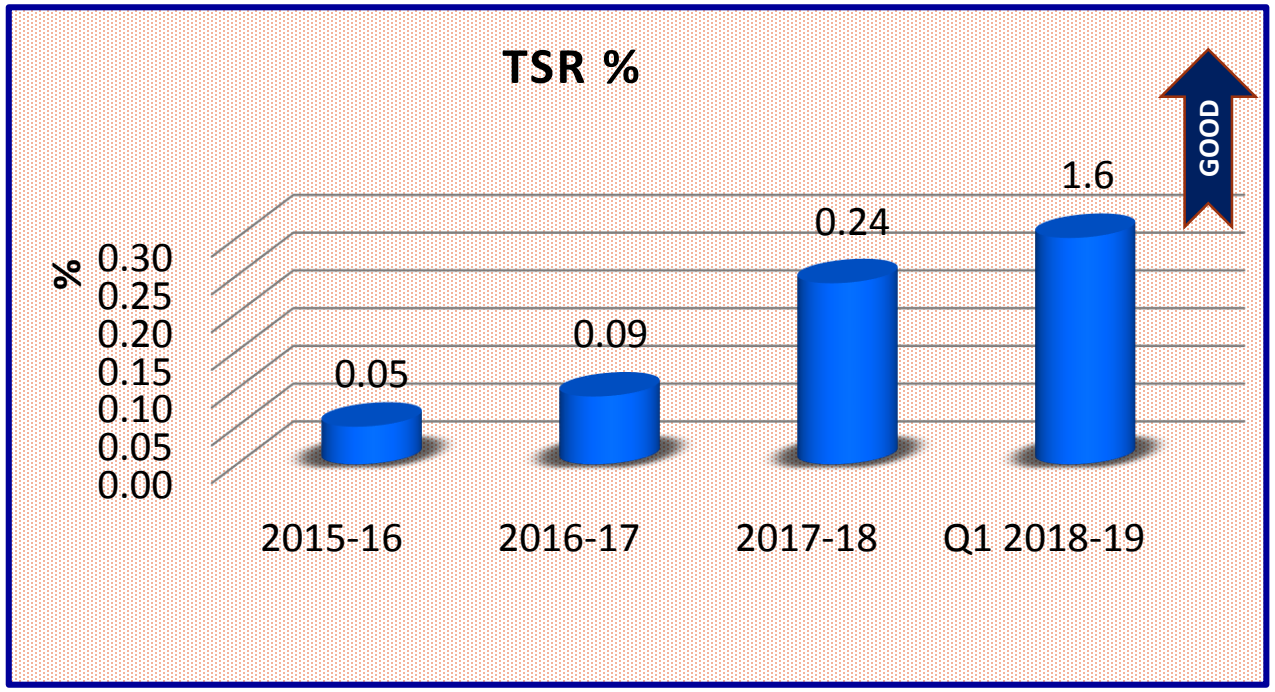
Green Township

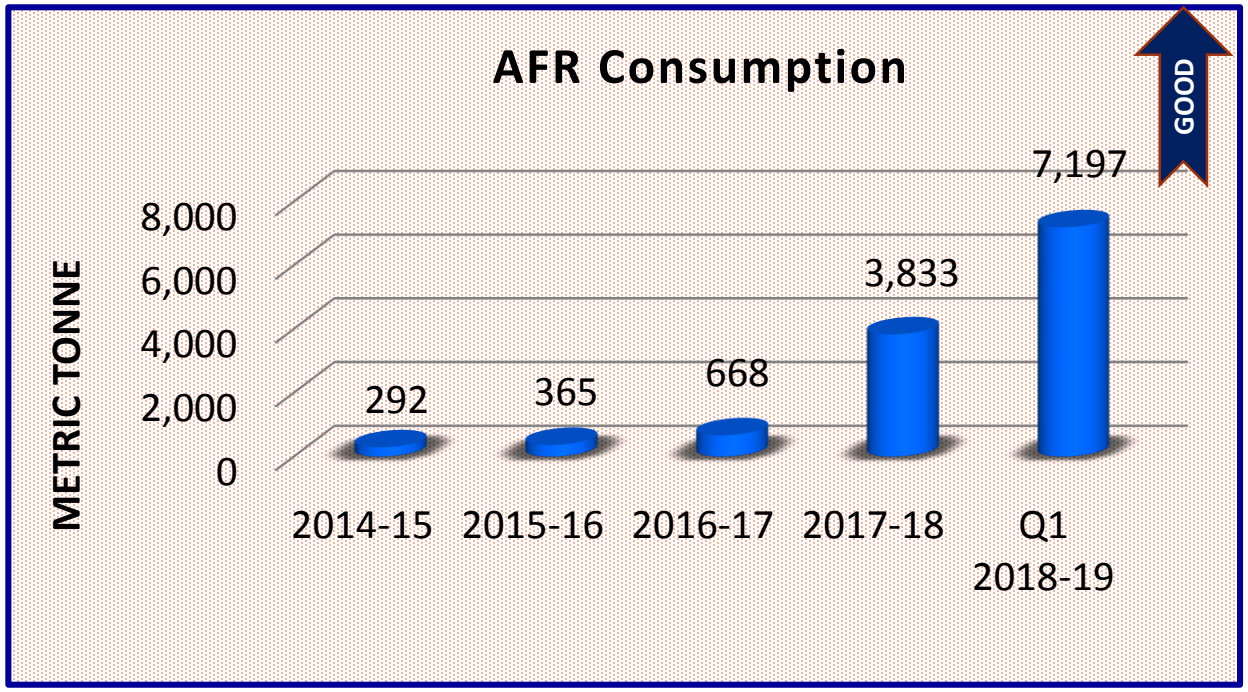
- 800 KWp Solar Panels Installed in plant
- Installed in FY 2011-12
- Colony Power requirement mainly catered through Solar power generation
- 10MW Solar Power Plant in Planning (FY19)



Utilization of Waste Material

List of Alternate fuel used at Rawan Cement Works



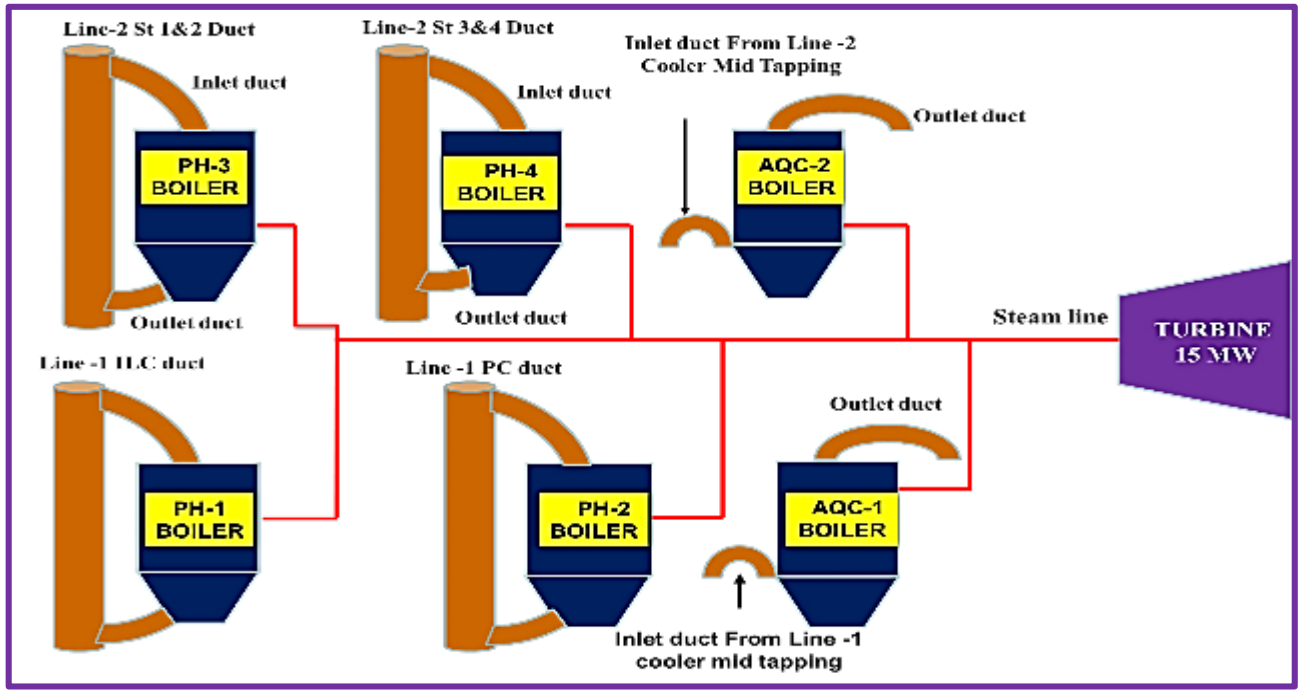


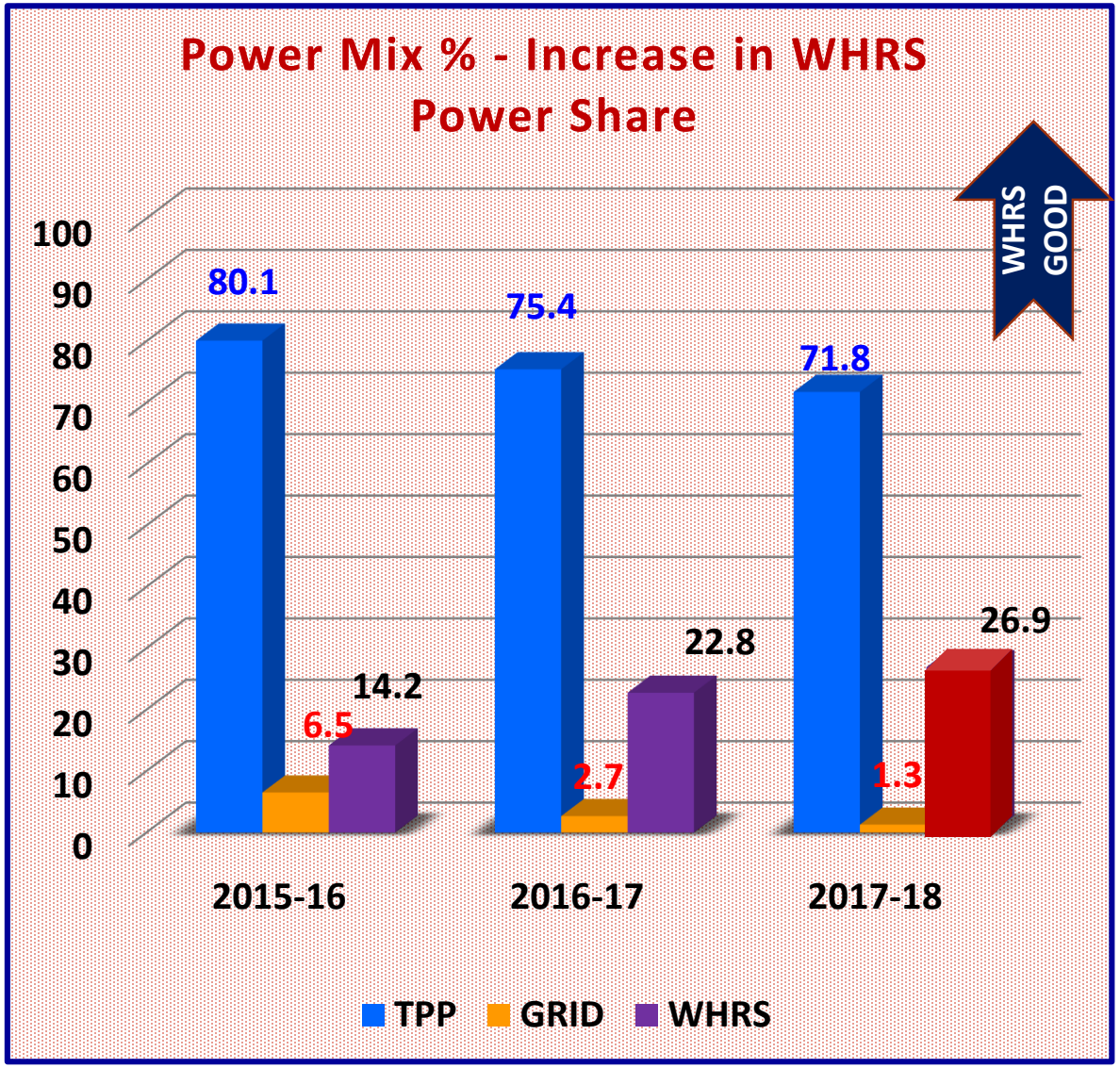
- WOODEN CHIPS
- FMCG WASTE
- MIX AGRO WASTE
- PHARMA LIQUID
- SUGARCANE BAGGASE
- PLASTIC WASTE
- NON HAZARDOUS WASTES (POULRTY)
- CASHEWNUT SHELL
- PHARMA SOLID
- SAW DUST
- COCONUT SHELL
- FOOTWEAR SCRAP

Utilization of Waste Material

Waste Heat Recovery System

Waste Heat Recovery System of 16 MW (6 nos. Boilers) at Rawan Cement Works is meant to operate continuously with any of the Clinkerisation system running. Running of WHRS results in fossil fuel conservation, better environment and low power cost due to reduction in Grid and TPP power mix %



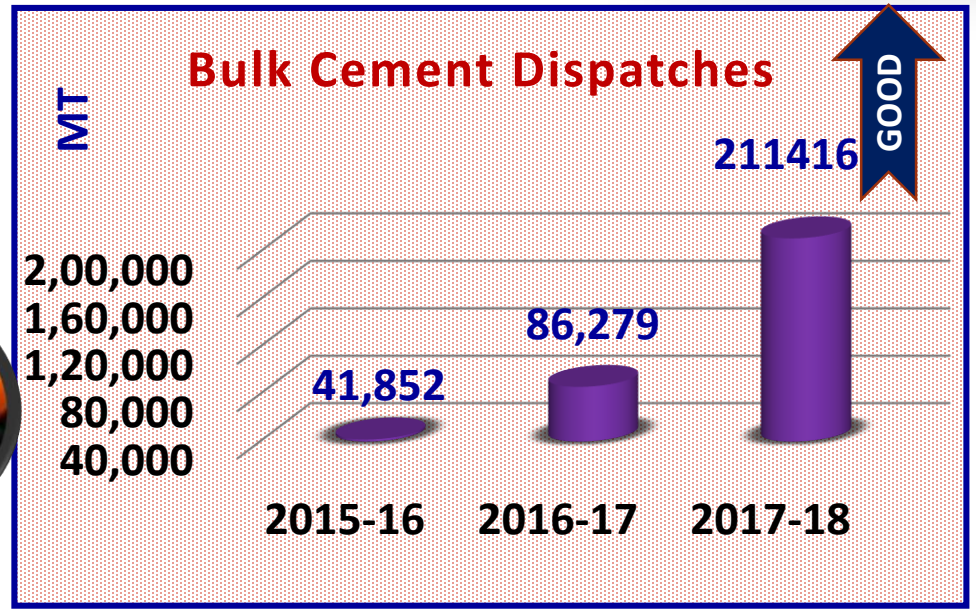


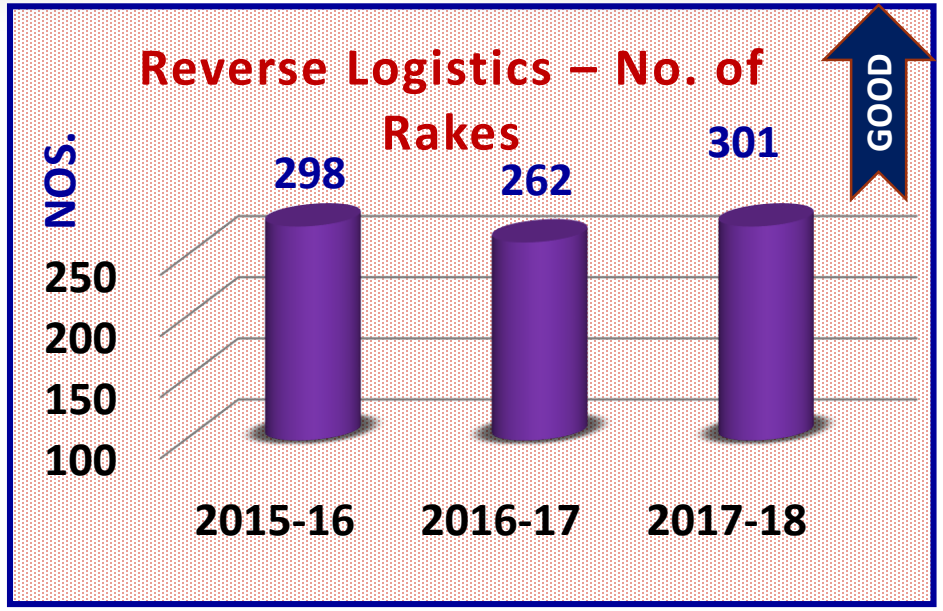
Best Practices in Green Supply Chain

- Reverse Logistics in Fly Ash Bulker, Coal Wagons, Raw Material Trucks (Hywa)
- Eye on Wheels – to reduce truck turnaround time
- Maximise Bulk Cement Dispatches

Incoming Coal, Gypsum Rake

Outgoing Clinker rake





Safety Initiatives

We Care For Safety

ADITYA BIRLA
UltraTech

Build beautiful
UltraTech CEMENT
The Engineer's Choice

ADITYA BIRLA
UltraTech

UltraTech Cement Ltd.
Rawan Cement Works

Safety Policy

UltraTech Cement is committed to continually improve standards in Safety, with the aim of providing and maintaining a safe and healthy work environment for employees, customers, business associates, suppliers and visitors.

UltraTech believes that :
- Injuries can be prevented
- Safety is a business imperative and
- Consultation and employee involvement is essential to achieve safety excellence.

UltraTech shall ensure that appropriate resources are provided and actions taken to implement and maintain an effective safety management system so that employees are passionate about their own health and safety at work and beyond the work place too.

Every employee, including line managers, is responsible for the effective implementation of the safety systems across the business.

Consistent with this, UltraTech shall :
- Strive for continual improvement in Safety management system;
- Ensure that the policy is communicated to all employees and is made available to all interested parties;
- Comply with relevant statutory requirement, codes of practice and industry standars relating to installation, design and maintenance;
- Provide a safe work place by identifying, assessing and reducing risks to as low as reasonably practicable (ALARP) from process, machinery, infrastructure and human behaviour;
- Provide information, instruction, training and supervision to empower people to perform their roles in a safe manner, hence to safeguard life and avoid property damage;
- Involce employees, business associates, distributors and suppliers in Safety matters, initiatives and consult with them in ways to reduce workplace hazards;
- Report all incidents, investigate throughly and implement control measures to prevent recurrence;
- Continue to strengthen our systems, standards and procedures for preventing and mitigating any potential emergency situations;
- Develop and implement Safety Objectives that are consistent with Aditya Birla Group guidelines;
- Carry out periodical reviews to ensure that the policy continues to be relevant and appropriate;

Safety is both an individual and shared responsiblity of all employees, business associates, and other persons involved with UltraTech operations.

K.K. Maheshwari
Occupier & Chairman, Safety Board

September 2016

Unit's Safety Best Practices

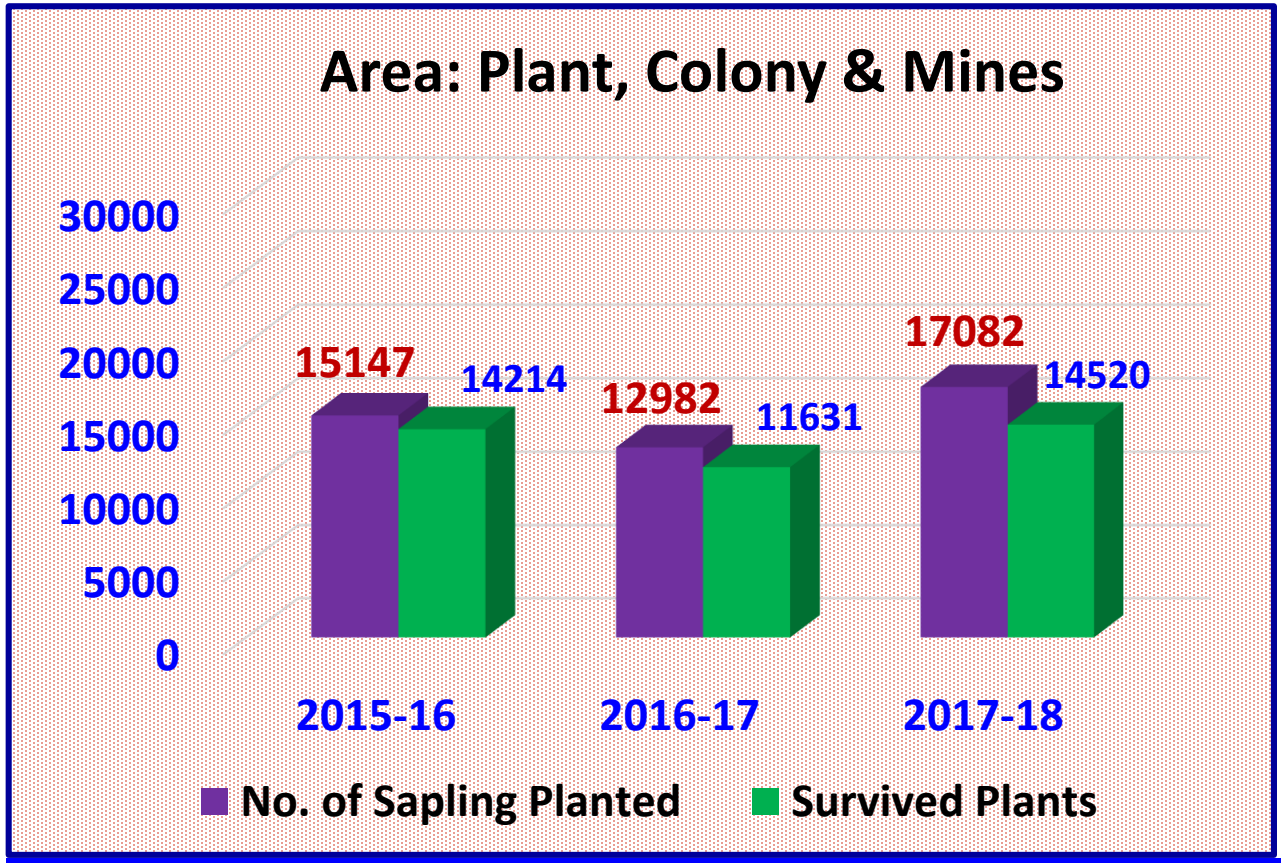
- **Mentor-Mentee Engagement** of workers for Safety culture improvement **"Study Paper Published in Harvard University"**
- **One Full Day Safety Round** "One Day Safety Officer"
- Extending safety beyond work place: First- Day, First –hour, Safety- hours & Bicycle helmet for ABPS School students
- **Safety Observation** by all Management cadre employees (two nos. per month)
- **"Safety Rath"** OJT Safety awareness by animated cartoon/videos
- **Theme based Safety Campaign** on Monthly basis
- **"My Setu"** Online System for reporting of safety Activities.

Environmental Initiatives

Rain Water Harvesting Pond

Entire water requirement for Plant and Colony is being fulfilled by Rain Water Pond

Green Belt Development



Unit is committed to develop Green Belt with cumulative Plantation till FY18- 611845

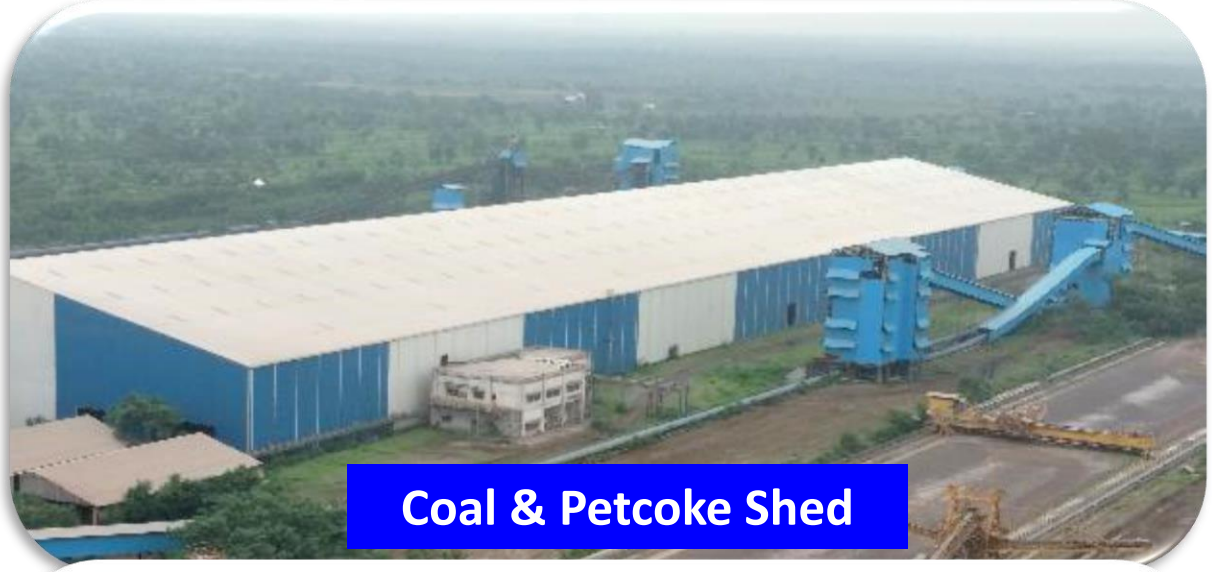
Environmental Initiatives

Line-1 Cement Mill ESP to Baghouse Conversion
FY 2017-18
Capex Amount: Rs. 1.9 Crore

Line-1 Coal Mill ESP to Baghouse Conversion
FY 2017-18
Capex Amount: Rs. 4.9 Crore

Environmental Initiatives

Ongoing Improvement Project to utilize 100% STP Water for Plant & TPP Operation



Coal & Petcoke Shed

Limestone Pile Shed

Awards: Journey Towards Excellence

CII 19th National Award for Excellence in Energy Management 2018

Looking Ahead

Year	Award
2008	Rajiv Gandhi
2008	CII Energy Award
2008	Excellence in Innovation - CWCM
2009	Rajiv Gandhi National Quality
2011	Chairman WCM GOLD Award
2014	State - Energy Efficiency Award by CREDA (Consecutive Since 2014)
2015	IMC Rama Krishna Bajaj Quality Award
2016	DL Shah Quality Award (GOLD)
2017	CII Excellent Energy Efficient Unit CSR Excellence Award 2017 & REPRISM 2017

Integrity | Commitment | Passion | Seamlessness | Speed

Awards: Journey Towards Excellence

CII National Energy Award 2017
"Excellent Energy Efficient Unit 2017"

Regional Level presentation in National Level Competition "REPRISM-2017" by Aditya Birla Group in the category of Energy Conservation

ADITYA BIRLA
UltraTech

Build beautiful
UltraTech CEMENT
The Engineer's Choice

Practice Conservation For the Future Generation

Thank You

Integrity | Commitment | Passion | Seamlessness | Speed